

National Shipbuilding Research Program (NSRP) FY25 Navy Directed Project “High-Density Blown Optical Fiber Cable & Tooling for Shipboard Installations Qualification”

By: Josh Seawell

Project Overview

- Program Refresher
 - SEL is under contract with Advanced Technology International (ATI) under Base Task Order Agreement No. 2025-372
 - Summary of project is to achieve QPL qualification for the following fiber bundles
 - 12f, loose fiber SMF and MMF (OM1/62.5um), (MIL-PRF-85045/27)
 - 48f, FFR SMF (MIL-PRF-85045/38)
 - 72f, FFR SMF (MIL-PRF-85045/39)
- Updated Program Schedule

What are Air Blown Fibers?

Sumitomo Electric Lightwave was the first to introduce air blown fiber technology in North America and is the leading Air-Blown Fiber provider for over 30 years.

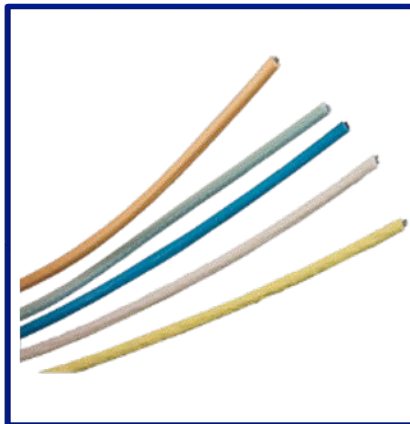
FutureFLEX® Air-Blown Fiber offers unprecedented ease of installation, flexibility, and cost savings across a wide range of design needs for current and future network requirements.

FutureFLEX® Air-Blown Fiber greatly reduces initial man-hour installation costs as well as future network/capacity expense.

FiberFutureFLEX® Air-Blown Fiber consists of five key components all of which are produced by Sumitomo:



Tube Cables

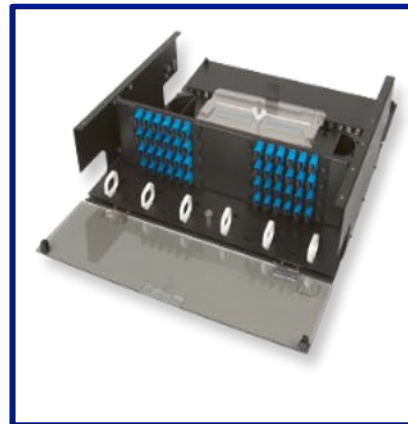


Fiber Bundles

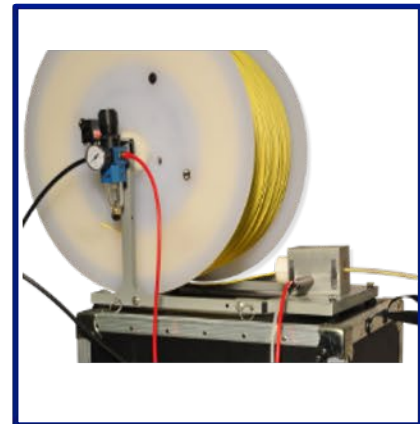
Only product
seeking QPL
certification



**Distribution
Equipment**



**Fiber Termination
Equipment**



**Blowing
Equipment**

Air Blown Fiber System - Quick and Easy Installation

Simple 3 Steps

Step 1 – Create an End-to-End Pathway
- Tube Cable, Distribution, and Termination Boxes

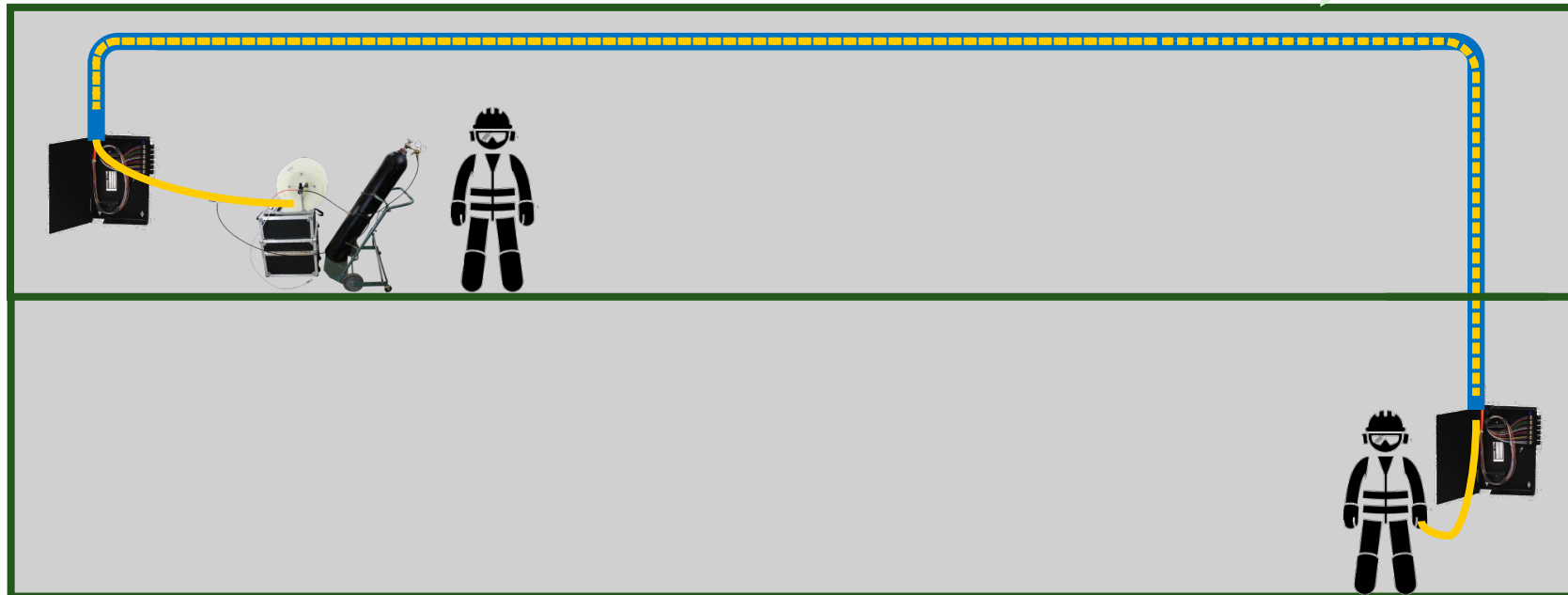
Step 2 – Select & Install the Fiber Bundle

Step 3 – Terminate the Fiber Bundles at Required termination locations

Air Blown Fiber System - Quick and Easy Installation

FEATURES & BENEFITS

- Easily and quickly install fiber from point A to B
- Same deck, multiple decks, etc.
- Minimal personnel needed



Design and Construction

- **12f:**
 - Fibers = SM and MM (MIL-PRF-49291)
 - $\lambda \leq 3$ g/m
 - OD = 1.2 mm to 2.2 mm
- **48f:**
 - Fibers = SM, 12f pliable ribbon
 - $\lambda \leq 6$ g/m
 - OD = 3.1 mm
- **72f:**
 - Fibers = SM, 12f pliable ribbon
 - $\lambda \leq 6$ g/m
 - OD = 3.7 mm

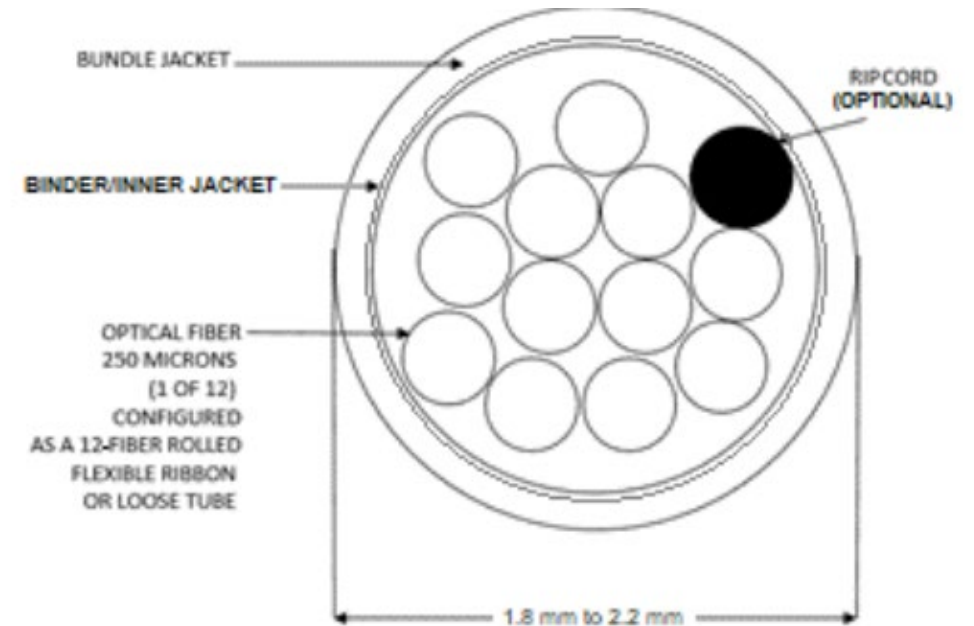


FIGURE 1. Blown optical 12-fiber bundle.

Design and Construction: 48f and 72f

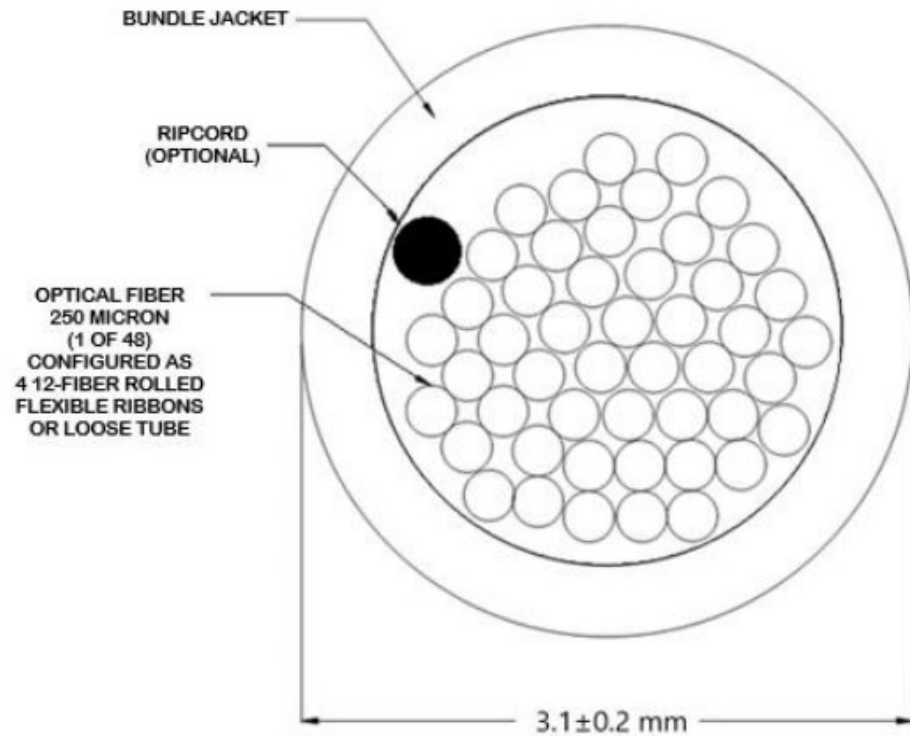


FIGURE 1. Fiber bundle, blown optical fiber, 48-fiber rolled flexible ribbon or loose tube.

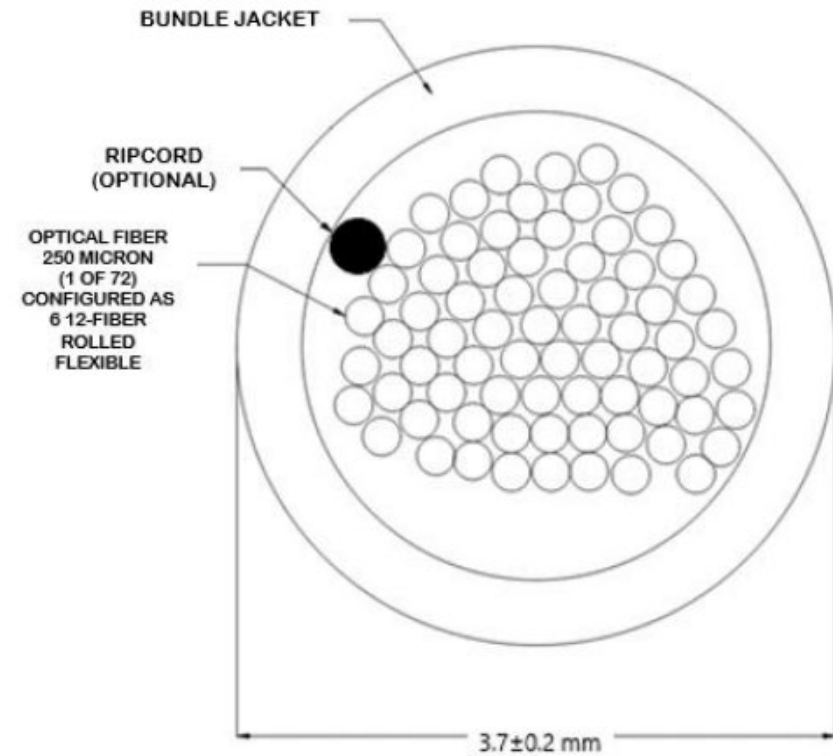


FIGURE 1. Fiber bundle, blown optical fiber, 72-fiber rolled flexible ribbon, six 12-fiber subunits.

Qualifications

TABLE II. Qualification and conformance inspection.

Group	Qualification inspection	Requirement paragraph	Test paragraph	Cable length ^{1/} , ^{2/} , ^{3/} , ^{4/}	Conformance inspection
I	Visual and mechanical inspection	3.4, 3.9, 3.10	4.7.2	Three samples, 0.5 km each ^{5/}	A
	Attenuation rate	3.5.1	4.7.4.1	Three samples, 0.5 km each ^{6/}	A
	Point discontinuity	^{7/}	^{7/}	Three samples, 0.5 km each ^{6/}	--
II	Crosstalk	3.5.3	4.7.4.3	Three samples, 0.5 km each ^{6/}	--
III	Temperature cycling	3.7.1	^{7/}	Two samples, 0.5 km each ^{6/} (one on reel, one off)	C
	Temperature humidity cycling	3.7.3	4.7.6.3	Two samples, 0.5 km each ^{8/}	C
	Storage temperature	3.7.4	4.7.6.4	Two samples, 0.5 km each ^{8/}	--
	Cyclic flexing	3.6.4	4.7.5.4	Six specimens, 5 m each ^{9/} (two specimens at each temp)	--
	Temperature life (life aging)	^{7/}	^{7/}	Two specimens, 300 m each ^{10/}	C
	Fungus resistance	3.8.4	4.8.4	Two specimens, 0.5 m each ^{10/}	--
	Cable element removability	3.6.18	4.7.5.18	Two specimens, 0.5 m each ^{10/}	C
IV	Thermal shock	3.7.2	4.7.6.2	One specimen, 0.5 km ^{6/} (on reel)	--
	Jacket self-adhesion or blocking	3.7.11	4.7.6.11	One specimen, 30 m ^{11/}	--
	Shock	3.7.13	4.7.6.13	One specimen, 30 m ^{11/}	--
V	Dripping	3.6.13	4.7.5.13	One specimen, 30 cm ^{11/}	--
	Cable jacket tear strength	3.6.14	4.7.5.14	Five flat extruded jacket material strips ^{12/}	C
	Cable shrinkage	3.6.17	4.7.5.17	Three specimens, 0.5 m each ^{11/}	C
	Flame extinguishing and smoke generation	3.7.12.2	4.7.6.12.2	One specimen, 50 m ^{11/}	C
	Water absorption	3.7.14	4.7.6.14	Two specimens, extruded jacket material strips ^{12/}	--
VI	Acid gas generation	3.8.1	4.8.1	One specimen, 1 m ^{13/}	C
	Halogen content	3.8.2	4.8.2	One specimen, 1 m ^{13/}	--
	Toxicity index	3.8.3	4.8.3	One specimen, 1 m ^{13/}	C
	Smoke index	3.8.5	4.8.6	One specimen, 1 m ^{13/}	C

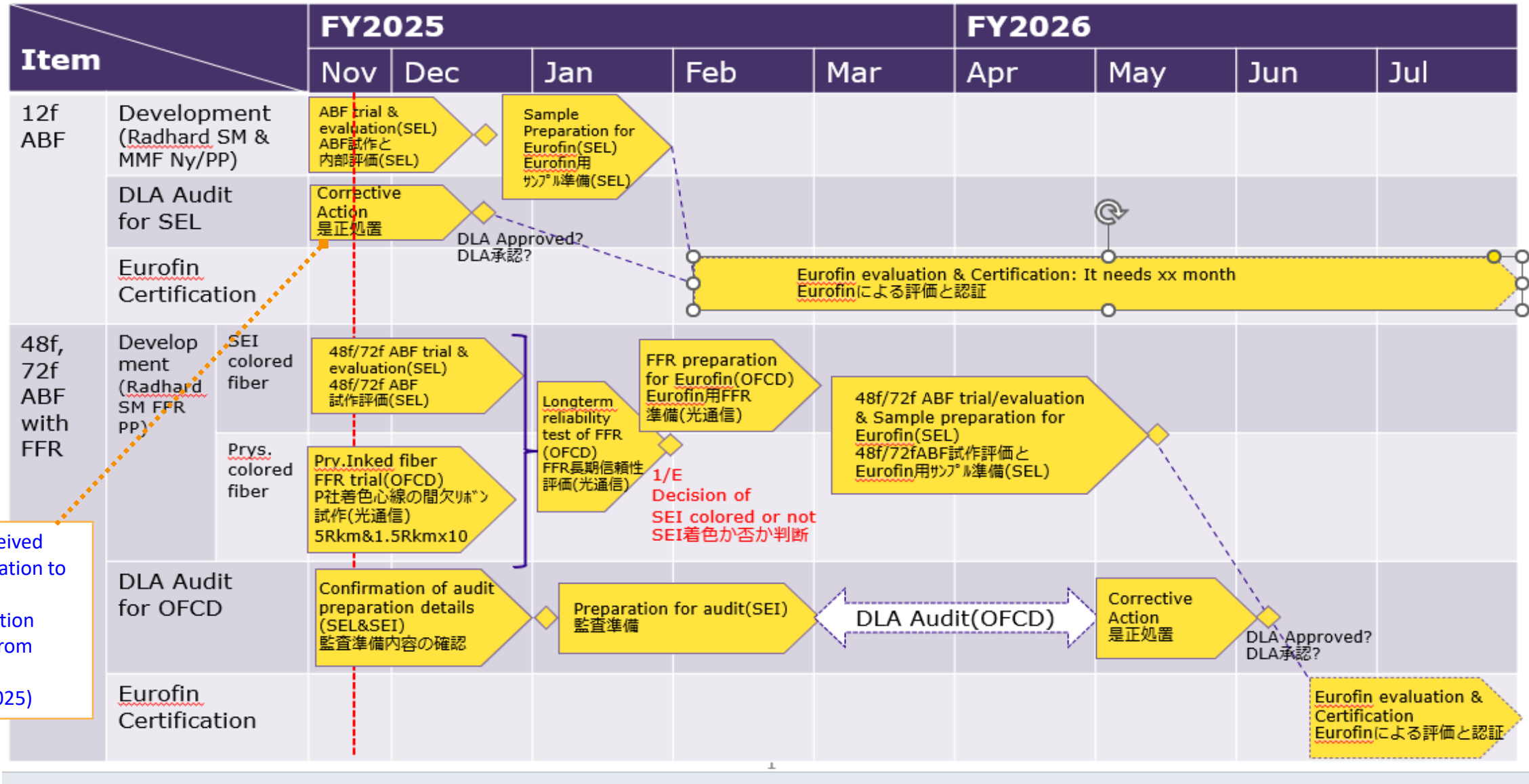
- Eurofins
- Retention = SEL/Eurofins

TABLE II. Qualification and conformance inspection – Continued.

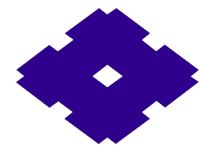
Group	Qualification inspection	Requirement paragraph	Test paragraph	Cable length ^{1/} , ^{2/} , ^{3/} , ^{4/}	Conformance inspection
VII ^{14/}	Ribbon strippability	^{7/}	^{7/}	Three specimens, 2 m each ^{14/}	--
	Ribbon delamination	^{7/}	^{7/}	Three specimens, 2 m each ^{14/}	--
	Ribbon separation	^{7/}	^{7/}	One specimen, 0.5 m ^{14/}	--

[Tentative] US Navy ABF Project timeline (US Navy ABF線表案)

Revised: 11/24



12f: Received authorization to conduct qualification testing from NAVSEA (11/7/2025)



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