DEPARTMENT OF THE NAVY
NAVAL RESEARCH LABORATORY
4555 OVERLOOK AVE SW
WASHINGTON DC 20375-5320

IN REPLY REFER TO
3900
Ser 6180/0218
NOV 03 2015

From: Commanding Officer, Naval Research Laboratory
To: Commander, Naval Sea Systems Command (Code 05P S. Fletcher)

Subj: RESULTS OF MIL-F-24385F QUALIFICATION TESTING OF THE ICL PERFORMANCE PRODUCTS LP PHOS-CHEK 3% AFFF MS AND PHOS-CHEK 6% AFFF MS CONCENTRATES

Encl: (1) One copy of subject report

1. Enclosure (1) is forwarded for your information and retention.

2. This report provides results of the qualification testing for the ICL Phos-Chek 3% AFFF MS and the Phos-Chek 6% AFFF MS concentrates, which was evaluated against the MIL-F-24385F, "Fire Extinguishing Agent, Aqueous Film Forming Foam (AFFF) Liquid Concentrate for Fresh and Seawater" qualification standard. The Phos-Chek 3% AFFF MS product met all of the fire extinguishment and burn back protection requirements of the MIL-F-24385F test standard. The Phos-Chek 6% AFFF MS product met all of the fire extinguishment and burn back protection requirements with the exception of the quintuple burn back protection fire test requirement. Based on these results it is recommended that the Phos-Check 3% AFFF MS be listed on the AFFF Qualified Products List (QPL).

3. The Naval Research Laboratory's point of contact is John P. Farley Code 6186, (202) 404-8459, e-mail: john.farley@nrl.navy.mil.

B. J. Sparco

BARRY J. SPARCO
By direction

Copy to:
COMNAVSEASYSCOM (Code 05P Hunstad)

6180/00218A:JPF
03 Nov 2015

Results of Mil-F-24385F Qualification Testing of the ICL Performance Products LP Phos-Chek 3% AFFF MS and Phos-Chek 6% AFFF MS Concentrates

John P. Farley
Clarence Whitehurst
Katherine M. Hinnant

Naval Research Laboratory
Chemistry Division
Washington, DC

Ralph Ouellette
Stanley Karwoski Jr.

Jensen Hughes
Baltimore, MD

Encl (1) to NRL Ltr
3900
Ser 6180/0218

EXECUTIVE SUMMARY

This report provides the test results for the ICL Performance Products LP Phos-Chek 3% AFFF MS and the Phos-Chek 6% AFFF MS concentrates, which were evaluated against the MIL-F-24385F qualification standard.

The detailed test results are given in the following pages. The Phos-Chek 3% AFFF MS product met all of the fire extinguishment and burn back protection requirements of the MIL-F-24385F test standard. The Phos-Chek 6% AFFF MS product met all of the fire extinguishment and burn back requirements with the exception of the quintuple burn back protection fire test requirement. The failure of the Phos-Chek 6% AFFF MS product during the quintuple burn back fire test may result from the following combination of factors:

- The burn back performance with a low flash point fuel is strongly influenced by diffusion through the foam blanket. NRL's AFFF core research program has demonstrated that diffusion is influenced by foam surfactants enhancing solubility of hydrocarbons in the foam solution, relative to their low solubility in pure water.

- The Phos-Chek 6% AFFF MS product has a very low interfacial tension against cyclohexane (spreading coefficient determination of MIL-F-24385F) of approximately 1.1 dynes/cm. This means that some of the surfactants within the Phos-Chek product may have a high affinity for hydrocarbons, which could lead to enhanced fuel solubility in the surfactant micelles.

- Due to the refractive index requirement, a Type 6 solution will typically contain more solvent (e.g., butyl carbitol) than a Type 3 solution. Additionally, glycol ethers tend to have affinity for both water and fuel, so the solvent may further enhance fuel solvation.

- The refractive indices measured for the Phos-Chek concentrates are substantially above the minimum MILSPEC values, indicating that the concentrates may contain a fairly high level of solvents. The Type 6 concentrate had a refractive index of 1.3609, compared to a minimum requirement of 1.3580.

Based on these results is recommended that the Phos-Chek 3% AFFF MS product be included in the AFFF Qualified Products List (QPL).

Test results--Paragraphs denoted below refer to the applicable section of MIL-F-24385F

Paragraph 3.3 Chemical and Physical Requirements for Concentrates

Property	Type 6 Criteria	Type 6 Value	Pass/ Fail	Type 3 Criteria	Type 3 Value	Pass/ Fail
Viscosity @25°C (C) cSt	≥ 2	2.87	Pass	≥2	3.73	Pass
Viscosity @5°C (C) cSt	≤10	5.78	Pass	≤20	7.42	Pass
Hydrogen Ion (pH) (C)	7-8.5	7.99	Pass	7-8.5	8.06	Pass
Spreading Coefficient on cyclohexane (dynes/cm) (M)	≥3.0	7.73	Pass	≥3.0	7.63	Pass
Index of refraction	≥1.3580	1.3609	Pass	≥1.3630	1.3675	Pass
Foamability (average of two measurements for each condition):						
Fresh Water Expansion Ratio (M)	≥5.0	7.5	Pass	≥5.0	7.1	Pass
Fresh Water Drain Time (M) (minutes)	≥2:30	5:30	Pass	≥2:30	5:41	Pass
Salt Water Expansion Ratio (M)	≥5.0	7.9	Pass	≥5.0	7.3	Pass
Salt Water Drain Time (M) (minutes)	≥2:30	4:41	Pass	≥2:30	4:46	Pass
Corrosion Rate (C)						
steel (10^{-3} inches/yr)	≤1.5	1.2	Pass	≤1.5	0.925	Pass
Cu-Ni (10^{-3} inches/yr)	≤1.0	0.06	Pass	≤1.0	0.034	Pass
Ni-Cu (10^{-3} inches/yr)	≤1.0	0.03	Pass	≤1.0	0.019	Pass
Bronze (mg)	≤100	0.9	Pass	≤100	0.040	Pass
Localized pitting (Corrosion-resistant steel)	No Pits	No Pits	Pass	No pits	No Pits	Pass
Total Halides (C) (ppm)	≤250	36.8	Pass	≤500	71.6	Pass
Dry Chemical Compatibility						
Burn Back time (s) (M)	≥360	508	Pass	≥360	617	Pass
Environmental Impact						
Toxicity (TC_{50}) mg/L (C)	≥1000	>1000*	Pass	≥500	>1000*	Pass
COD (g O_2/L) (C)	≤500	451	Pass	≤1000	576	Pass
BOD_{20}/COD (C)	≥0.65	.80	Pass	≥0.65	.82	Pass

>1000* = No fish mortality observed at a concentration of 1000 mg/L (concentrate).

Paragraph 3.3.2 Stability

Property	Type 6 Criteria	Type 6 Value	Pass/ Fail	Type 3 Criteria	Type 3 Value	Pass/ Fail
Spreading Coefficient on cyclohexane (dynes/cm) (M)						
using aged concentrate mixed with fresh water	≥3.0	6.88	Pass	≥3.0	6.85	Pass
using aged premix with fresh water	≥3.0	7.10	Pass	≥3.0	6.75	Pass
using aged premix with salt water	≥3.0	6.21	Pass	≥3.0	6.28	Pass
Foamability using aged concentrate(average of two measurements):						
Fresh Water Expansion Ratio (M)	≥5.0	7.5	Pass	≥5.0	7.3	Pass
Fresh Water Drain Time (M) (minutes)	≥2:30	5:25	Pass	≥2:30	4:41	Pass
Salt Water Expansion Ratio (M)	≥5.0	7.7	Pass	≥5.0	7.3	Pass
Salt Water Drain Time (M) (minutes)	≥2:30	6:16	Pass	≥2:30	4:23	Pass
Foamability using aged premix (average of two measurements):						
Fresh Water Expansion Ratio (M)	≥5.0	8.0	Pass	≥5.0	7.8	Pass
Fresh Water Drain Time (M) (minutes)	≥2:30	5:21	Pass	≥2:30	5:00	Pass
Sea Water Expansion Ratio (M)	≥5.0	8.1	Pass	≥5.0	7.9	Pass
Sea Water Drain Time (M) (minutes)	≥2:30	4:32	Pass	≥2:30	4:43	Pass
Film Formation						
from aged concentrate, full strength, fresh water	no ignition	no ignition	Pass	no ignition	no ignition	Pass
from aged concentrate, full strength, sea water	no ignition	no ignition	Pass	no ignition	no ignition	Pass
from aged premix, full strength, fresh water	no ignition	no ignition	Pass	no ignition	no ignition	Pass
from aged premix, full strength, sea water	no ignition	no ignition	Pass	no ignition	no ignition	Pass
Fire Performance (M)						
Aged Concentrate, 1/2 strength, fresh water						
Extinguishment time (s)	≤45	45	Pass	≤45	45	Pass
Burn back time (s)	≥300	386	Pass	≥300	439	Pass
Aged Concentrate, 1/2 strength, sea water						
Extinguishment time (s)	≤45	43	Pass	≤45	42	Pass
Burn back time (s)	≥300	452	Pass	≥300	450	Pass
Aged Premix, full strength, fresh water						
Extinguishment time (s)	≤30	27	Pass	≤30	26	Pass
Burn back time (s)	≥360	481	Pass	≥360	584	Pass
Aged Premix, full strength, sea water						
Extinguishment time (s)	≤30	24	Pass	≤30	29	Pass
Burn back time (s)	≥360	497	Pass	≥360	515	Pass

Paragraph 3.3.2 Stability (cont.)

Property	Type 6 Criteria	Type 6 Value	Pass/ Fail	Type 3 Criteria	Type 3 Value	Pass/ Fail
Stratification						
using aged concentrate mixed with fresh water	N.O.*	N.O.	Pass	N.O.	N.O.	Pass
using aged premix with fresh water	N.O.	N.O.	Pass	N.O.	N.O.	Pass
using aged premix with salt water	N.O.	N.O.	Pass	N.O.	N.O.	Pass
Precipitation (vol%) (M):						
using aged concentrate mixed with fresh water	≤0.05 mL	N.O.	Pass	≤0.05	N.O.	Pass
using aged premix with fresh water	≤0.05 mL	N.O.	Pass	≤0.05	N.O.	Pass
using aged premix with salt water	≤0.05 mL	0.005 mL	Pass	≤0.05	N.O.	Pass

N.O.* = None observed.

Paragraph 3.3.3 Compatibility
Mixture: Phos-Chek 3% MS / Buckeye (50/50) (Type 3)

Requirement	Criteria	Value	Pass/ Fail
Stratification			
using aged concentrate	N.O.*	N.O.	Pass
Precipitation (vol%):			
using aged concentrate	≤0.05	N.O.	Pass
Foamability using aged concentrate(average of two measurements):			
Fresh Water Expansion Ratio (M)	≥5.0	8.2	Pass
Fresh Water Drain Time (M) (minutes)	≥2:30	5:28	Pass
Salt Water Expansion Ratio (M)	≥5.0	7.8	Pass
Salt Water Drain Time (M) (minutes)	≥2:30	5:24	Pass
Film Formation (M)			
from aged concentrate, 1/2 strength, fresh water	no ignition	no ignition	Pass
from aged concentrate, 1/2 strength, sea water	no ignition	no ignition	Pass
Fire Performance (M)			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	28	Pass
Burn back time (s)	≥360	555	Pass
Aged Concentrate, sea water			
Extinguishment time (s)	≤30	25	Pass
Burn back time (s)	≥360	520	Pass

*N.O. = None observed.

Paragraph 3.3.3 Compatibility
Mixture: Phos-Chek 3% MS / National Foam (50/50) (Type 3)

Requirement	Criteria	Value	Pass/ Fail
Stratification			
using aged concentrate	N.O.*	N.O.	Pass
Precipitation (vol%):			
using aged concentrate	≤0.05	N.O.	Pass
Foamability using aged concentrate(average of two measurements):			
Fresh Water Expansion Ratio (M)	≥5.0	8.15	Pass
Fresh Water Drain Time (M) (minutes)	≥2:30	5:03	Pass
Salt Water Expansion Ratio (M)	≥5.0	7.5	Pass
Salt Water Drain Time (M) (minutes)	≥2:30	4:36	Pass
Film Formation (M)			
from aged concentrate, 1/2 strength, fresh water	no ignition	no ignition	Pass
from aged concentrate, 1/2 strength, sea water	no ignition	no ignition	Pass
Fire Performance (M)			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	28	Pass
Burn back time (s)	≥360	480	Pass
Aged Concentrate, sea water			
Extinguishment time (s)	≤30	25	Pass
Burn back time (s)	≥360	577	Pass

*N.O. = None observed.

Paragraph 3.3.3 Compatibility
Mixture: Phos-Chek 3% MS / Tridol (50/50) (Type 3)

Requirement	Criteria	Value	Pass/ Fail
Stratification			
using aged concentrate	N.O.	N.O.	Pass
Precipitation (vol%):			
using aged concentrate	≤0.05	N.O.	Pass
Foamability using aged concentrate(average of two measurements):			
Fresh Water Expansion Ratio (M)	≥5.0	7.6	Pass
Fresh Water Drain Time (M) (minutes)	≥2:30	4:46	Pass
Salt Water Expansion Ratio (M)	≥5.0	7.3	Pass
Salt Water Drain Time (M) (minutes)	≥2:30	5:15	Pass
Film Formation (M)			
from aged concentrate, 1/2 strength, fresh water	no ignition	no ignition	Pass
from aged concentrate, 1/2 strength, sea water	no ignition	no ignition	Pass
Fire Performance (M)			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	26	Pass
Burn back time (s)	≥360	456	Pass
Aged Concentrate, sea water			
Extinguishment time (s)	≤30	26	Pass
Burn back time (s)	≥360	515	Pass

Paragraph 3.3.3 Compatibility
Mixture: Phos-Chek 3% MS / Ansulite (50/50) (Type 3)

Requirement	Criteria	Value	Pass/ Fail
Stratification			
using aged concentrate	N.O.*	N.O.	Pass
Precipitation (vol%):			
using aged concentrate	≤0.05	N.O.	Pass
Foamability using aged concentrate(average of two measurements):			
Fresh Water Expansion Ratio (M)	≥5.0	7.7	Pass
Fresh Water Drain Time (M) (minutes)	≥2:30	4:30	Pass
Salt Water Expansion Ratio (M)	≥5.0	7.3	Pass
Salt Water Drain Time (M) (minutes)	≥2:30	5:19	Pass
Film Formation (M)			
from aged concentrate, 1/2 strength, fresh water	no ignition	no ignition	Pass
from aged concentrate, 1/2 strength, sea water	no ignition	no ignition	Pass
Fire Performance (M)			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	28	Pass
Burn back time (s)	≥360	460	Pass
Aged Concentrate, sea water			
Extinguishment time (s)	≤30	26	Pass
Burn back time (s)	≥360	495	Pass

*N.O. = None observed.

Paragraph 3.3.3 Compatibility
Mixture: Phos-Chek 3% MS / Chemguard (50/50) (Type 3)

Requirement	Criteria	Value	Pass/ Fail
Stratification			
using aged concentrate	N.O.	N.O.	Pass
Precipitation (vol%):			
using aged concentrate	≤0.05	N.O.	Pass
Foamability using aged concentrate(average of two measurements):			
Fresh Water Expansion Ratio (M)	≥5.0	7.7	Pass
Fresh Water Drain Time (M) (minutes)	≥2:30	4:00	Pass
Salt Water Expansion Ratio (M)	≥5.0	7.4	Pass
Salt Water Drain Time (M) (minutes)	≥2:30	4:46	Pass
Film Formation (M)			
from aged concentrate, 1/2 strength, fresh water	no ignition	no ignition	Pass
from aged concentrate, 1/2 strength, sea water	no ignition	no ignition	Pass
Fire Performance (M)			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	28	Pass
Burn back time (s)	≥360	390	Pass
Aged Concentrate, sea water			
Extinguishment time (s)	≤30	27	Pass
Burn back time (s)	≥360	448	Pass

Paragraph 3.3.3 Compatibility
Mixture: 1/6 Phos-Chek 3% MS/Buckeye/National/Tridol/Ansulite/Chemguard (Type 3)

Requirement	Criteria	Value	Pass/ Fail
Stratification			
using aged concentrate	N.O.*	N.O.	Pass
Precipitation (vol%):			
using aged concentrate	≤0.05	N.O.	Pass
Foamability using aged concentrate(average of two measurements):			
Fresh Water Expansion Ratio (M)	≥5.0	7.4	Pass
Fresh Water Drain Time (M) (minutes)	≥2:30	4:50	Pass
Salt Water Expansion Ratio (M)	≥5.0	7.5	Pass
Salt Water Drain Time (M) (minutes)	≥2:30	5:00	Pass
Film Formation (M)			
from aged concentrate, 1/2 strength, fresh water	no ignition	no ignition	Pass
from aged concentrate, 1/2 strength, sea water	no ignition	no ignition	Pass
Fire Performance (M)			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	27	Pass
Burn back time (s)	≥360	597	Pass
Aged Concentrate, sea water			
Extinguishment time (s)	≤30	29	Pass
Burn back time (s)	≥360	517	Pass

*N.O. = None observed.

Paragraph 3.3.3 Compatibility
Mixture: Phos-Chek 6% MS / National (Type 6)

Requirement	Criteria	Value	Pass/ Fail
Stratification			
using aged concentrate	N.O.	N.O.	Pass
Precipitation (vol%):			
using aged concentrate	≤0.05	N.O.	Pass
Foamability using aged concentrate(average of two measurements):			
Fresh Water Expansion Ratio (M)	≥5.0	8.1	Pass
Fresh Water Drain Time (M) (minutes)	≥2:30	4:55	Pass
Salt Water Expansion Ratio (M)	≥5.0	7.8	Pass
Salt Water Drain Time (M) (minutes)	≥2:30	4:39	Pass
Film Formation (M)			
from aged concentrate, 1/2 strength, fresh water	no ignition	no ignition	Pass
from aged concentrate, 1/2 strength, sea water	No ignition	no ignition	Pass
Fire Performance (M)			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	23	Pass
Burn back time (s)	≥360	612	Pass
Aged Concentrate, sea water			
Extinguishment time (s)	≤30	27	Pass
Burn back time (s)	≥360	501	Pass

Paragraph 3.3.3 Compatibility
Mixture: Phos-Chek 6% MS / Fire Ade (50/50) (Type 6)

Requirement	Criteria	Value	Pass/ Fail
Stratification			
using aged concentrate	N.O.*	N.O.	Pass
Precipitation (vol%):			
using aged concentrate	≤0.05	0.01	Pass
Foamability using aged concentrate(average of two measurements):			
Fresh Water Expansion Ratio (M)	≥5.0	7.77	Pass
Fresh Water Drain Time (M) (minutes)	≥2:30	4:44	Pass
Salt Water Expansion Ratio (M)	≥5.0	7.75	Pass
Salt Water Drain Time (M) (minutes)	≥2:30	4:53	Pass
Film Formation (M)			
from aged concentrate, 1/2 strength, fresh water	no ignition	no ignition	Pass
from aged concentrate, 1/2 strength, sea water	no ignition	no ignition	Pass
Fire Performance (M)			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	30	Pass
Burn back time (s)	≥360	517	Pass
Aged Concentrate, sea water			
Extinguishment time (s)	≤30	29	Pass
Burn back time (s)	≥360	508	Pass

*N.O. = None observed.

Paragraph 3.3.3 Compatibility
Mixture: Phos-Chek 6% MS / Chemguard (50/50) (Type 6)

Requirement	Criteria	Value	Pass/ Fail
Stratification			
using aged concentrate	N.O.	N.O.	Pass
Precipitation (vol%):			
using aged concentrate	≤0.05	None	Pass
Foamability using aged concentrate(average of two measurements):			
Fresh Water Expansion Ratio (M)	≥5.0	7.6	Pass
Fresh Water Drain Time (M) (minutes)	≥2:30	5:00	Pass
Salt Water Expansion Ratio (M)	≥5.0	7.2	Pass
Salt Water Drain Time (M) (minutes)	≥2:30	5:15	Pass
Film Formation (M)			
from aged concentrate, 1/2 strength, fresh water	no ignition	no ignition	Pass
from aged concentrate, 1/2 strength, sea water	no ignition	no ignition	Pass
Fire Performance (M)			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	27	Pass
Burn back time (s)	≥360	559	Pass
Aged Concentrate, sea water			
Extinguishment time (s)	≤30	29	Pass
Burn back time (s)	≥360	640	Pass

Paragraph 3.3.3 Compatibility
Mixture: Phos-Chek 6% MS / Ansulite (50/50) (Type 6)

Requirement	Criteria	Value	Pass/ Fail
Stratification			
using aged concentrate	N.O.*	N.O.	Pass
Precipitation (vol%):			
using aged concentrate	≤0.05	None	Pass
Foamability using aged concentrate(average of two measurements):			
Fresh Water Expansion Ratio (M)	≥5.0	7.7	Pass
Fresh Water Drain Time (M) (minutes)	≥2:30	4:36	Pass
Salt Water Expansion Ratio (M)	≥5.0	7.53	Pass
Salt Water Drain Time (M) (minutes)	≥2:30	5:08	Pass
Film Formation (M)			
from aged concentrate, 1/2 strength, fresh water	no ignition	no ignition	Pass
from aged concentrate, 1/2 strength, sea water	no ignition	no ignition	Pass
Fire Performance (M)			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	27	Pass
Burn back time (s)	≥360	424	Pass
Aged Concentrate, sea water			
Extinguishment time (s)	≤30	29	Pass
Burn back time (s)	≥360	494	Pass

*N.O. = None observed.

Paragraph 3.3.3 Compatibility
Mixture: 1/5 Phos-Chek 6% MS/National/FireAde/Ansulite/Chemguard (Type 6)

Requirement	Criteria	Value	Pass/ Fail
Stratification			
using aged concentrate	N.O.	N.O.	Pass
Precipitation (vol%):			
using aged concentrate	≤0.05	N.O.	Pass
Foamability using aged concentrate(average of two measurements):			
Fresh Water Expansion Ratio (M)	≥5.0	7.9	Pass
Fresh Water Drain Time (M) (minutes)	≥2:30	4:53	Pass
Salt Water Expansion Ratio (M)	≥5.0	7.5	Pass
Salt Water Drain Time (M) (minutes)	≥2:30	4:34	Pass
Film Formation (M)			
from aged concentrate, 1/2 strength, fresh water	no ignition	no ignition	Pass
from aged concentrate, 1/2 strength, sea water	no ignition	no ignition	Pass
Fire Performance (M)			
Aged Concentrate, fresh water			
Extinguishment time (s)	≤30	28	Pass
Burn back time (s)	≥360	455	Pass
Aged Concentrate, sea water			
Extinguishment time (s)	≤30	27	Pass
Burn back time (s)	≥360	555	Pass

Paragraph 3.4 Fire Performance

	Type 6 requirement	Type 6 Value	Pass/ Fail	Type 3 requirement	Type 3 Value	Pass/ Fail
28 ft^2 Extinguishment Time (s)						
Fresh Water 1/2 strength	≤45	36	Pass	≤45	35	Pass
Fresh Water full strength	≤30	28	Pass	≤30	28	Pass
Salt Water 1/2 strength	≤45	39	Pass	≤45	32	Pass
Salt Water full strength	≤30	27	Pass	≤30	27	Pass
Salt Water Quintuple Strength	≤55	44[1]	Pass	≤55	45	Pass
Burn Back Time (s)						
Fresh Water 1/2 strength	≥300	421	Pass	≥300	489	Pass
Fresh Water full strength	≥360	518	Pass	≥360	439	Pass
Salt Water 1/2 strength	≥300	463	Pass	≥300	489	Pass
Salt Water full strength	≥360	485	Pass	≥360	541	Pass
Salt Water Quintuple Strength	≥200	114[2]	Fail	≥200	270	Pass
50 ft^2 Fire Test (Sea Water)						
Extinguishment time (s)	≤50	37	Pass	≤50	39	Pass
Burn back time (s)	≥360	361	Pass	≥360	361	Pass
40 second summation	≥320	355	Pass	≥320	354	Pass

Note 1: Additional Extinguishment Times Included 54 sec and 49 sec
Note 2: Additional Burn Back Times Included 115 sec and 90 sec

Other properties: Torque to open container 30 inch-pounds "PASS" (MILSPEC standard ≤ 50 inch-pounds).