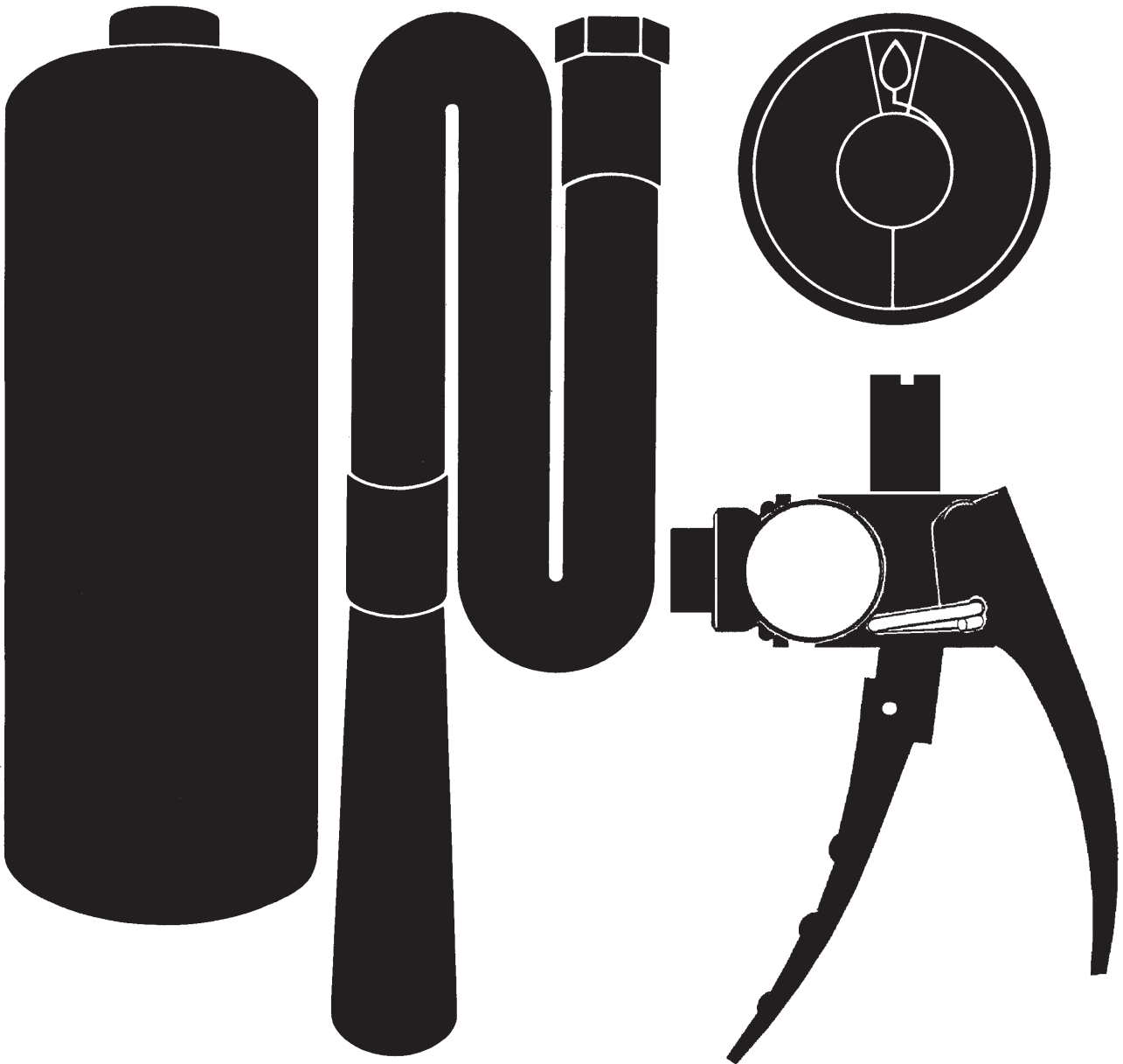


**APPROVED ANSUL® ASSEMBLY MANUAL
FOR ALTERNATE MANUFACTURING
LOCATION - FHC**



ASSEMBLY MANUAL



000769

This manual is intended for use in the assembly of SENTRY Carbon Dioxide Hand Portable Extinguishers and RED LINE Cartridge-Operated Hand Portable Extinguishers.

Those who assemble these fire extinguishers should read this entire manual. Specific sections will be of particular interest depending upon one's responsibilities.

Fire extinguishers are mechanical devices. They require periodic care. If the extinguishers are not assembled properly, they may not perform reliably.

These extinguishers are pressure vessels that must be treated with respect and handled with care.

Only Authorized SENTRY and RED LINE Distributors shall be allowed to service and maintain SENTRY and RED LINE products with genuine SENTRY and RED LINE components.

This manual is limited to uses herein described.

Note: The converted values in this manual are provided for dimensional reference only and do not reflect an actual measurement.

DISCLAIMER:

Johnson Controls does not make any representations, warranties or guarantees, expressed or implied, as to the accuracy or completeness of the manual. Users must be aware that updates and amendments will be made from time to time to the manual. It is the user's responsibility to determine whether there have been any such updates or amendments. Neither Johnson Controls nor any of its directors, officers, employees, or agents shall be liable in contract, tort, or in any other manner to any person for any loss, damage, injury, liability, cost, or expense of any nature, including without limitation incidental, special, direct, or consequential damages arising out of or in connection with the use of the manual.

All instructions contained herein relate to a typical installation.

Form Number: F-2018124-01

Date: 2019-MAY-29

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DANGER

Indicates a hazardous situation in which a person **will experience serious personal injury or death** if the situation is not avoided.

WARNING

Indicates a hazardous situation in which a person **could experience serious personal injury or death** if the situation is not avoided.

CAUTION

Indicates a hazardous situation in which a person **could experience minor or moderate personal injury** if the situation is not avoided.

CAUTION

Addresses practices not related to personal injury, such as a system part malfunctioning, property damage, or system failure.

NOTICE

Addresses general practices or observations related to system function that are *not* related to personal injury.

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*Approved ANSUL® Assembly Manual for
Alternate Manufacturing Location - FHC
(Form No. F-2018124)*

NOTES:

ABOUT THIS SECTION

This section is a comprehensive guide containing the necessary information for filling, assembling, and handling of Approved Agency manufacturer's test program for SENTRY Carbon Dioxide Extinguishers.

The information outlined in this section is to be used as instruction for properly trained personnel. The outline of this section has been arranged in a logical way for easy comprehension.

Each assembly is to receive the Approved Agency's Certification mark. This means each manufacturer's test program listed in this section must be strictly followed.

INTRODUCTION

SENTRY Carbon Dioxide Extinguishers are designed to protect areas where Class B (flammable liquids and gases) or Class C (energized electrical equipment) fires could occur. They may be used indoors where winds and drafts do not affect discharge or where a clean suppressing agent is required.

SENTRY Carbon Dioxide Extinguishers are ideal for laboratories, electronic equipment, low voltage electrical equipment, and municipal fire departments.

Available in agent capacities of 5 lb (2.3 kg), 10 lb (4.5 kg), 15 lb (6.8 kg), and 20 lb (9.1 kg).

TECHNICAL INFORMATION

The assemblies covered in this section reflect SENTRY Carbon Dioxide Hand Portable Extinguishers. Tables 1-1, 1-2, and 1-3 contain technical data pertaining to the final assembly.

TABLE 1-1: SENTRY CARBON DIOXIDE HAND PORTABLE EXTINGUISHERS

Model	CD05A-1	CD10A-1	CD15A-1	CD20A-1
Extinguisher Part No.	431622	431623	431624	431625
Agent Capacity	5 lb (2.3 kg)	10 lb (4.5 kg)	15 lb (6.8 kg)	20 lb (9.1 kg)
UL/ULC Rating	5-B:C	10-B:C	10-B:C	10-B:C
Coast Guard Classification	Type B, C, Size I	Type B, C, Size I	Type B, C, Size I	Type B, C, Size II
Discharge Time (sec)	10	10	11	13
Service Pressure	1,800 psi (124 bar)	1,800 psi (124 bar)	1,800 psi (124 bar)	1,800 psi (124 bar)
Maximum Effective Range	6 ft (1.8 m)	6 ft (1.8 m)	6 ft (1.8 m)	6 ft (1.8 m)
Shell (outside diameter)	5 1/4 in. (133 mm)	6 29/32 in. (175 mm)	6 29/32 in. (175 mm)	8 in. (203 mm)
Hose Length (5/16 in. Dia.) (7.9 mm Dia.)	Discharge Tube with Horn	36 in. (914 mm)	36 in. (914 mm)	36 in. (914 mm)
Charged Weight (with agent, without hose and horn)	13.50 lb (6.1 kg)	26.75 lb (12.1 kg)	35.75 lb (16.2 kg)	46.75 lb (21.2 kg)
Dimensions (without hose and horn)				
Height:	19.75 in. (502 mm)	22.25 in. (565 mm)	28 in. (711 mm)	28 in. (711 mm)
Width:	7.25 in. (184 mm)	10.94 in. (278 mm)	10.94 in. (278 mm)	12 in. (305 mm)
Depth:	5.69 in. (136 mm)	7 in. (178 mm)	7 in. (178 mm)	8.098 in. (206 mm)
Fire Suppression Capability				
Novice:	5 ft ² (0.47 m ²)	10 ft ² (0.93 m ²)	10 ft ² (0.93 m ²)	10 ft ² (0.93 m ²)
Experienced:	12 ft ² (1.2 m ²)	25 ft ² (2.3 m ²)	25 ft ² (2.3 m ²)	25 ft ² (2.3 m ²)

CROSS REFERENCES

Fire Hazard Control (FHC) will receive unassembled kits from Marinette, WI facility. Each unassembled kit part number references the final assembly part number listed in Tables 1-1 and 1-2. Once the unassembled kits have been fully assembled in accordance with this assembly manual, the extinguishers receive the final shipping assembly part number. Table 1-2 references unassembled kit part numbers to shipping assembly part numbers.

BILL OF MATERIALS

Each assembled kit consists of various sub-assemblies and parts. Reference the Final Assembly print that correlates to the Alternate Manufacturing Location (AML) unassembled kit in Table 1-2 Unassembled Kits to Final Shipping. Each component listed in the Kit Bill of Materials (Kit BOM) must be accounted for in the final shipping assembly.

**TABLE 1-2: UNASSEMBLED KITS TO FINAL SHIPPING ASSEMBLY PART NUMBERS
FOR CARBON DIOXIDE EXTINGUISHERS**

Description	Final Shipping Assembly Part No.	FHC Unassembled Kits Part No.
CD05A-1 (Aluminum Shell)	431622	448002
CD10A-1 (Aluminum Shell)	431623	448003
CD15A-1 (Aluminum Shell)	431624	448004
CD20A-1 (Aluminum Shell)	431625	448005

GOODS IN AND INSPECTION

Upon receiving material, the following procedure is to be performed.

1. When the shipment from the primary manufacturing location has been received, each component must be accounted for, component received must be checked to Kit BOM. Each component to be stored in a designated area that is marked specifically by part number.
2. Verify that all split inspection identified components, per final shipping assembly Kit BOM are properly labeled with the split inspection green dot from the Marinette, WI facility. Components identified with split inspection green dot must remain marked and/or in packaging until used for assembly.
3. All bulk CO₂ gases must meet the approved criteria:
 - a. CO₂: Shall meet Drawing Specifications.
 - b. A Certificate of Conformance (COC) to the previously mentioned requirements must accompany each shipment and maintained in the record.
4. All nameplates must be recorded and COCs maintained on file from manufacturer. Scrap nameplates must be recorded and the serial numbers retained for Approved Agencies.

APPROVED AGENCY MANUFACTURER'S TEST AND BATCH INSPECTION PROGRAM

In order for the Approved Agency mark to be applied to finished assemblies, the manufacturing site must comply with the listed manufacturer inspection responsibilities. If requirements are not met, the Approved Agency mark cannot be placed on the extinguisher. Test equipment used during inspection must remain in calibration and perform properly. Calibration must be completed according to the Approved Agency Calibration requirements, see Section 3, Appendix 1 for details.

Calibration certificate and standards for calibration must be kept until the next calibration is complete and be readily available for review by an Approved Agency Representative. Quality procedures must be in place; if calibration of equipment is returned out of specification (e.g., a fill gauge calibration is returned as out of specification), implement the corrective action procedure for any items that were manufactured while the equipment was out of calibration.

Proper documentation of inspections must be kept for 6 months and made readily available to Approved Agency Representative. The documentation must include the model or catalog designation of the product, the date of production, the tests performed, and the test results. A system must be in place to identify and isolate material that has been tested or not tested, either complies or not complies, scheduled for rework, or the like.

Manufacturer's Inspection Responsibilities

The manufacturer is responsible for completing all test requirements outlined in the Approved Agency follow-up procedure. The following inspection responsibilities are for reference:

1. **Locking Devices and Seals:** Once a week, 2 samples must be selected from production. The manufacturer will determine the force required to remove the locking device (visual seal). The force must comply with the specified amount in the procedure.

Either a spring scale or an incremental weight test may be used to determine the force required to remove or deactivate the locking device. Have the scale or weights attached to locking device and the device operated in the intended manner. The tension will increase uniformly until the locking device pulls (breaks) the seal.
2. **The maximum force read on tester to disengage the locking device** must be recorded and within specification in the Approved Agency's procedure.
3. **Discharge Duration, Minimum Carbon Dioxide Discharged, and Weight of Charge Determinations:** One sample per model for low volumes under 500 pieces. If multiple CO₂ models are made during a shift, then test one sample of the smallest and one sample of the largest capacity models. The manufacturer will determine the discharge duration to gas point, the minimum Carbon Dioxide discharge (complete discharge), and weight of the charge are as required. The samples selected for the charged weight, discharge duration, and minimum Carbon Dioxide discharge does not need to be from the same sample. To determine the charged weight, take the difference of the full weight

and the empty weight of the extinguisher. It must be verified that all are within the specification as listed in the Approved Agency's follow up procedure, reference data in Table 3-1.

Note: Charge weight for CO₂ is without horn/hose assembly.

Necessary equipment to perform the test include a stopwatch and a scale in ounces. The sample unit will be weighed fully charged and recorded. The sample unit will then be discharged and timed. The sample unit will be held vertically 3 ft (9.1 m) off the ground. If a hose is on the unit, the unit may stay on the ground with the hose extended horizontally.

The discharge time to gas point and weight of the extinguisher after discharge are to be recorded. Depress push-lever and discharge any remaining pressure. Reassemble the valve and weigh empty unit and record the weight.

4. **Extinguisher Leakage Test:** All stored pressure extinguishers will undergo an extinguisher leakage test. Extinguishers that show no sign of leaking are acceptable. Extinguishers showing evidence of leaking will be rejected. The manufacturer has the option to retest the failed unit by setting it aside for 24 hours and then retest. If the unit now passes, the unit will be considered as acceptable.
5. **Rate of Flow:** Once a week, 2 units will be used for this test. The extinguishers are to be charged with the appropriate agent and pressurized according to specifications. The unit hose will be held horizontally and discharged. The time taken to discharge the unit will be recorded and compared to the time specified in the technical data tables.

Additional Approved Agency Testing

For testing that is required off-site by an Approved Agency's laboratory or representative, samples must be made readily available upon request of the Approved Agency's representative.

Calibration Timing

Calibration of all equipment used for manufacturers inspection and assembly/filling processes must be kept according to the following schedule:

1. Quarterly: Plug Gauge Scales
2. Monthly: Pressure Gauge
3. Annually: Stop Watches
Spring Scale
Incremental weight test

SENTRY CARBON DIOXIDE EXTINGUISHER ASSEMBLY WORK INSTRUCTIONS

Note: For part drawings associated with assembly and verification, see Approved Agency's file for applicable drawings.

1. Inspect Cylinder

- Pick cylinder from pallet.
- Ensure no paint damage, scratches, or dents.
- Check for internal debris and moisture/water using small light. Cylinder must be completely dry without contamination.



2. Attach Valve Assembly

- Locate valve assembly.
- Inspect condition of valve assembly and pick-up tube.
- Apply Blue Loctite 242 on threads of pick-up tube.
- Connect the pick-up tube to valve using proper wrench tool.



- Screw valve assembly into cylinder until hand tight to 3 to 4 turns.



- Tighten valve assembly to a maximum of 37 ft-lb to 44 ft-lb (50 N•m to 59.7 N•m) using assembly equipment.



NOTICE

Overtightening can cause cylinder to crack.

3. Attach Nameplates

- Clean the exterior of the shell of all Carbon Dioxide and foreign debris.
- Position nameplate so that the vertical centerline of the nameplate is aligned with the centerline of the stamped side of valve.
- Position the nameplate so that it is located the proper distance from the bottom edge of the extinguisher (see assembly print for proper label location).
- Remove covering from self-sticking adhesive and carefully press label to extinguisher.



SENTRY CARBON DIOXIDE ASSEMBLY WORK INSTRUCTIONS (Continued)

4. Record Weight

- Tare scale.
- Weigh cylinder with valve assembly only. Do not include horn or hose assembly.
- Stamp empty weight on valve.

5. Fill Cylinder with Carbon Dioxide (CD)

- Connect extinguisher to fill station port using charging adapter.



- Place on scale.
- Tare cylinder weight.



WARNING

Never leave a regulated high pressure source connected to an extinguisher for an extended period of time. Defective regulator could result in a violent failure of the extinguisher.

- Open the CD cylinder valve.
- Open the charging system ball valve.

- Press extinguisher lever and fill to the proper extinguisher weight (see Table 1-3).

NOTICE

Do not relieve charging system pressure or remove charging adaptor until ring pin and visual seal are assembled.

- Release extinguisher lever.

TABLE 1-3

Extinguisher	Weight Range
CD05A-1	5 lb ± 0.25 lb
CD10A-1	10 lb ± 0.5 lb
CD15A-1	15 lb ± 0.5 lb
CD20A-1	20 lb ± 0.5 lb

6. Attach Ring Pin and Visual Seal

- Insert ring pin through the hole in the top push lever and valve body.



- Install visual seal through ring pin loop and around top push lever.



- 2 x week, pull test to be completed and not exceed 15 lb (6.8 kg) on seal.

7. Remove from Charging System

- Release pressure from the charging system at the regulator.
- Remove the charging adapter.
- Fill weight of extinguisher to be stamped into valve body. Does not include horn or hose assembly.

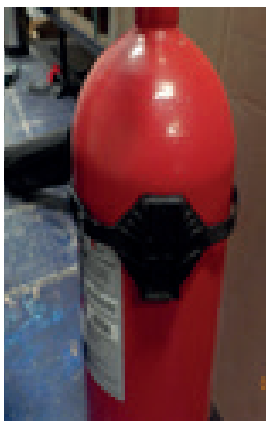
**SENTRY CARBON DIOXIDE ASSEMBLY
WORK INSTRUCTIONS (Continued)**

8. Leak Test

- Maintain water bath at 90 °F to 110 °F
(32 °C to 43 °C)
- Fully submerge all extinguishers.
- Cover top push lever/valve with clear cover. Make sure
all air pockets are removed.
- Hold in water bath for 1 hour.
- If no bubbles are observed, unit passes test.
- If bubbles are observed, the following are test require-
ments:
 - Minimum size of bubble to be detected:
1/8 in. (3.175 mm)
 - Smallest allowable leak rate: 1.05×10^{-5} cc/sec

9. Attach Hose and Retainer

- Attach hose retainer around cylinder, pulling snug.
- Trim off excess retainer band.



10. Assemble Horn and Hose

- Apply Loctite on nozzle threads before assembly.
- Assemble hose, horn, and nozzle orifice.



- Once assembled, perform a pull test to ensure nozzle
is seated into the horn.

NOTICE

No movement allowed.

11. Carton Assembly

- Assemble carton by stapling.
- Apply carton label over preprinted artwork on wide side
of carton.

12. Record Serial Number

- Record and maintain records of serialized nameplates.
 - Serial numbers must be documented per date of
manufacture.
 - Serial numbers must be documented per order.
 - Records must be maintained.
- Any serialized nameplates that are damaged or unus-
able for any reason must be destroyed and serial
numbers recorded.

13. Final Check

- Check the following:
 - Operating push-lever and carry handle are assem-
bled correctly.
 - Labels are in correct position.
 - Paint is free of blemishes.
 - Visual Seal is present.



14. Packaging

- Place completed assembly into carton.
- Add hose/horn assembly to carton.
- Add operation manual and necessary documentation.
- Add hanger bracket.
- Make sure hose is not crimped.
- Close carton by stapling.

NOTES:

ABOUT THIS SECTION

This section is a comprehensive guide containing the necessary information for filling, assembling, and handling of Approved Agency manufacturer's test program for RED LINE Cartridge-Operated Extinguishers.

The information outlined in this section is to be used as instruction for properly trained personnel. The outline of this section has been arranged in a logical way for easy comprehension.

Each assembly is to receive the Approved Agency's Certification mark. This means each Approved Agency manufacturer's test program listed in this section must be strictly followed.

INTRODUCTION

RED LINE Cartridge-Operated extinguishers are the premium firefighting extinguishers preferred by safety directors worldwide in high fire risk industries such as chemical, petro-chemical, oil and gas, mining, aviation, and power generation. Cartridge-operated means increased reliability, on-the-spot recharge, ease of service, and superior firefighting performance.

Typical applications include fuel loading racks, heavy construction sites, dip tanks, oil pumping stations, mining equipment, paint lockers, trucks and buses, fuel storage rooms, production lines and other. Tough, carbon steel shells resist impact, vibration, and corrosion; quality components stand up to years of service; and Super Durable polyester powder paint provides superior protection against cracking and chipping.

Available in agent capacities of approximately 10 lb (4.5 kg), 20 lb (9.1 kg), and 30 lb (13.6 kg).

TECHNICAL INFORMATION

The assemblies covered in this section reflect RED LINE Cartridge-Operated Extinguishers. Tables: 2-1, 2-2, and 2-3 contain technical data pertaining to the final assembly.

**TABLE 2-1: TECHNICAL DATA FOR RED LINE CARTRIDGE-OPERATED EXTINGUISHERS CONTAINING PURPLE-K DRY
CHEMICAL AGENT**

Model	I-K-10-G	I-K-20-G	I-K-30-G
Extinguisher Part No.	428227	428229	428231
Agent Capacity	9 lb (4.1 kg)	18 lb (8.2 kg)	27 lb (12.3 kg)
UL/ULC Rating	60-B:C	80-B:C	120-B:C
Coast Guard Classification	Type B, C	Type B, C	Type B, C
	Size II	Size III	Size IV
Discharge Time (sec)	19	21	27
Maximum Effective Range	25 ft (7.6 m)	30 ft (9.1 m)	30 ft (9.1 m)
Flow Rate	0.53 lb/sec (0.24 kg/sec)	0.89 lb/sec (0.40 kg/sec)	0.99 lb/sec (0.45 kg/sec)
Shell (outside diameter)	4.9 in. (124.5 mm)	6 in. (152.4 mm)	7 in. (177.8 mm)
Hose Length	26.6 in. (676 mm)	31.6 in. (803 mm)	35.6 in. (904 mm)
Charged Weight (with agent)	21 lb (9.5 kg)	36 lb (16.3 kg)	51.5 lb (23.4 kg)
Dimensions			
Height:	16.1 in. (409 mm)	20.5 in. (521 mm)	16.1 in. (409 mm)
Width:	8.3 in. (211 mm)	10.4 in. (264 mm)	8.3 in. (211 mm)
Depth:	5.3 in. (135 mm)	7.0 in. (178 mm)	5.3 in. (135 mm)
Fire Suppression Capability			
Novice:	60 ft ² (5.6 m ²)	80 ft ² (7.4 m ²)	120 ft ² (11.1 m ²)
Experienced:	150 ft ² (13.9 m ²)	200 ft ² (18.6 m ²)	300 ft ² (27.9 m ²)

TECHNICAL INFORMATION (Continued)

**TABLE 2-2: TECHNICAL DATA FOR RED LINE CARTRIDGE-OPERATED EXTINGUISHERS CONTAINING FORAY DRY
CHEMICAL AGENT**

Model	I-A-10-G-1	I-A-20-G-1	I-A-30-G-1
Extinguisher Part No.	435099	435127	435165
Agent Capacity	8.5 lb (3.9 kg)	17 lb (7.7 kg)	25 lb (11.3 kg)
Charged Weight	20.5 lb (9.3 kg)	35 lb (15.9 kg)	49.5 lb (22.5 kg)
Discharge Time (sec)	15	22	26
Coast Guard Classification	Type A, Size II	Type A, Size II	Type A, Size II
	Type B, C, Size I	Type B, C, Size II	Type B, C, Size III
UL/ULC Rating	4-A:40-B:C	6-A:60-B:C	10-A:80-B:C
Maximum Effective Range	17 ft (5.2 m)	20 ft (6.1 m)	20 ft (6.1 m)
Flow Rate	0.50 lb/sec (0.22 kg/sec)	0.77 lb/sec (0.35 kg/sec)	0.89 lb/sec (0.40 kg/sec)
Shell (outside diameter)	4.9 in. (124 mm)	6 in. (152 mm)	7 in. (178 mm)
Hose Length	26.6 in. (676 mm)	31.6 in. (803 mm)	35.6 in. (904 mm)
Charged Weight (with agent, without hose and horn)	21 lb (9.5 kg)	36 lb (16.3 kg)	51.5 lb (23.4 kg)
Dimensions (without hose and horn)			
Height:	16.1 in. (409 mm)	20.5 in. (521 mm)	22.5 in. (572 mm)
Width:	8.3 in. (211 mm)	10.4 in. (264 mm)	11.1 in. (282 mm)
Depth:	5.3 in. (135 mm)	7.0 in. (178 mm)	8.0 in. (203 mm)
Fire Suppression Capability			
Novice:	40 ft ² (5.6 m ²)	60 ft ² (7.4 m ²)	80 ft ² (11.1 m ²)
Experienced:	100 ft ² (9.3 m ²)	150 ft ² (13.9 m ²)	200 ft ² (18.6 m ²)

CROSS REFERENCES

FHC will receive unassembled kits from Marinette, WI facility. Each unassembled kit part number references the final assembly part number listed in Tables 2-1, 2-2, and 2-3. Once the unassembled kits have been fully assembled in accordance with this assembly manual, the extinguishers receive the final shipping assembly part number. Table 2-3 references unassembled kit part numbers to final assembly shipping part numbers.

BILL OF MATERIALS

Each assembled kit consists of various sub-assemblies and parts. Reference the Final Assembly print that correlates to the AML unassembled kit in Table 2-3 Unassembled Kits to Final Shipping Assembly. Each component listed in the Kit BOM must be accounted for in the final shipping assembly.

TABLE 2-3: UNASSEMBLED KITS TO FINAL SHIPPING ASSEMBLY

Assembly Part Numbers For RED LINE Dry Chemical Cartridge-Operated Extinguishers						
Description	Final Shipping Assembly Part No.	FHC Unassembled Kit Part No.	Bulk Dry Chemical Part No. from Final Shipping Assembly	AML Dry Chemical in Pails Part No.	Cartridge Part No. from Final Shipping Assembly	AML Cartridge Part No.
I-K-10-G	428227	448008	9342	447591	8832	447583
I-K-20-G	428229	448009	9342	447591	8833	447584
I-K-30-G	428231	448010	9342	447591	8834	447585
I-A-10-G-1	435099	448011	434905	447593	8832	447583
I-A-20-G-1	435127	448012	434905	447593	8833	447584
I-A-30-G-1	435165	448013	434905	447593	8834	447585

GOODS IN AND INSPECTION

Upon receiving material, the following procedure is to be performed:

1. When the shipment from the primary manufacturing location has been received, each component must be accounted for and checked to Kit BOM. Each component to be stored in a designated area that is marked specifically by part number.
2. Verify that all split inspection identified components, per final shipping assembly Kit BOM are properly labeled with the split green inspection dot from the Marinette, WI facility. Components identified with split inspection green dot must remain marked and/or in packaging until used for assembly.
3. Bulk agent must be stored in a location not exposed to more than 55% Relative Humidity, temperature range 65 °F to 80 °F (18 °C to 27 °C) and kept tightly sealed after opening.
4. All bulk CO₂ gases must meet the approved criteria:
 - a. CO₂: Shall meet Drawing Specifications.
 - b. A Certificate of Conformance (COC) to the Drawing Specification must accompany each shipment and maintained in the record.
5. All nameplates must be recorded, COCs maintained on file from manufacturer. Scrap Nameplates must be recorded and the serial numbers retained for Approved Agencies.

APPROVED AGENCY MANUFACTURER'S TEST AND BATCH INSPECTION PROGRAM

In order for the Approved Agency mark to be applied to finished assemblies, the manufacturing site must comply with the listed manufacturer inspection responsibilities. If requirements are not met, the Approved Agency mark cannot be placed on the extinguisher.

Test equipment used during inspection must remain in calibration and perform properly. Calibration must be completed according to the Approved Agency Calibration requirements, see Section 4, Appendix 2 for details. Calibration certificate and standards for calibration must be kept until the next calibration is complete and be readily available for review by an Approved Agency Representative. Quality procedures must be in place; if calibration of equipment is returned as out of specification (e.g. a fill gauge calibration is returned as out of specification), implement the corrective action procedure for any items that were manufactured while the equipment was out of calibration.

Proper documentation of inspections must be kept for 6 months and made readily available to Approved Agency Representative. The documentation must include the model or catalog designation of the product, the date of production, the tests performed, and the test results. A system must be in place to identify and isolate material that has been tested or not tested, either complies or not complies, scheduled for rework, or the like.

Manufacturer's Inspection Responsibilities

The manufacturer is responsible for completing all test requirements outlined in the Approved Agency follow-up procedure. The following inspection responsibilities are for reference.

1. **Locking Devices and Seals:** Once a week, 2 samples must be selected from production. The manufacturer will determine the force required to remove the locking device (visual seal). The force must comply with the specified amount in the procedure.

Either a spring scale or an incremental weight test may be used to determine the force required to remove or deactivate the locking device (visual seal). Have the scale or weights attached to locking device and the device operated in the intended manner. The tension will increase uniformly until the locking device pulls (breaks) the seal.
2. **The maximum force read on tester to disengage the locking device** must be recorded and within specification in the Approved Agency's procedure.
3. **Discharge Duration, Minimum Dry Chemical Discharged, and Weight of Charge Determinations:** two samples per model lots 500 and above, one sample per shift for low volumes under 500 pieces. The manufacturer will determine the discharge duration to gas point, the minimum dry chemical agent discharge (complete discharge), and weight of the charge are as required. The samples selected for the charged weight, discharge duration, and minimum dry chemical agent discharge does not need to be from the same sample. To determine the charged weight, take

the difference of the full weight and the empty weight of the extinguisher. It must be verified that all are within the specification as listed in the Approved Agency's follow up procedure, reference data in Table 4-1.

Necessary equipment to perform the test include a stopwatch and a scale in ounces. The sample unit will be weighed fully charged and recorded. The sample unit will then be discharged and timed. The sample unit will be held vertically 3 ft (9.1 m) off the ground. If a hose is on the unit, the unit may stay on the ground with the hose extended horizontally.

The discharge time to gas point and weight of the extinguisher after discharge are to be recorded. Remove the fill cap and empty the remaining agent. Reassemble the fill cap and weigh empty unit and record the weight.

4. **Rate of Flow:** Once a week, 2 units will be used for this test. The extinguishers are to be charged with the appropriate agent and pressurized according to specifications. The unit hose will be held horizontally and discharged. The time taken to discharge the unit will be recorded and compared to the time specified in the technical data tables.

Additional Approved Agency Testing

For testing that is required off-site by an Approved Agency's laboratory or representative, samples must be made readily available upon request of the Approved Agency's representative.

Calibration Timing

Calibration of all equipment used for manufacturers inspection and assembly/filling processes must be kept according to the following schedule:

1. Quarterly: Plug Gauge Scales
2. Monthly: Pressure Gauge
3. Annually: Stop Watches
Spring Scale
Incremental Weight Test

SECTION 2 – RED LINE CARTRIDGE-OPERATED PORTABLE EXTINGUISHER

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Approved ANSUL® Assembly Manual for
Alternate Manufacturing Location - FHC
(Form No. F-2018124)

RED LINE EXTINGUISHER ASSEMBLY WORK INSTRUCTIONS

Note: For part drawings associated with assembly and verification, see Approved Agency's file for applicable drawings.

1. Inspect Cylinder (Shell)

- Pick shell from pallet.
- Ensure no paint damage, scratches, or dents.
- Check for debris and moisture/water in shell using small light.



2. Attach Handle

- Locate pin, spring, and Rivet Tool.
- Line up spring with grooves in tool.



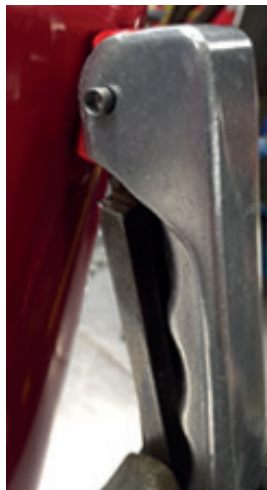
- Place handle over tool, lining up the holes.



- Place tool/handle on shell lug.
- Line up holes.



- Push rivet through handle and spring holes
remove tool.



- Roll rivet using proper rivetor.



**RED LINE EXTINGUISHER ASSEMBLY
WORK INSTRUCTIONS (Continued)**

3. Apply Lubricant to Gas Tube

- a. Using approved lubricant, Pro Dope (Part No. 9065), apply to end of gas tube.



- b. Apply same lubricant to cartridge receiver.



4. Assemble Gas Tube

- a. Insert gas tube into shell.



- b. Hold tube in place.



- c. Screw receiver on tube, threading on 2 turns.



- d. Hold gas tube vertically inside shell (use fixture per work instructions).



- e. Thread cartridge receiver into shell until hand tight; then use wrench to tighten receiver until only 2 to 2.5 threads are exposed.



5. Attach Hose

- a. Screw Nozzle Assembly onto hose. For the 10 lb (4.5 kg) model, apply "grease" to threads.



**RED LINE EXTINGUISHER ASSEMBLY
WORK INSTRUCTIONS (Continued)**

5. Attach Hose (Continued)

- b. Apply grease to shell threads - not in opening.
- c. Screw hose onto shell.



6. Attach Nameplates

- a. Pre-roll nameplate diameter to slightly smaller than the shell.

NOTICE

It is recommended that pressure and maximum heat (158 °F (70 °C)) be applied to entire surface of nameplate for 8 to 10 seconds.

- b. Clean the exterior of the shell of all dry chemical and foreign debris.
- c. Adhere rear, maintenance plate parallel with bottom of shell within 1 degree. Top of nameplate measured from bottom of shell:
10 lb (4.5 kg) = 280 mm (11 in) ± 12.7 mm (0.5 in)
20 lb (9.1 kg) = 330 mm (13 in) ± 12.7 mm (0.5 in)
30 lb (13.6 kg) = 370 mm (14.5 in) ± 12.7 mm (0.5 in)



- d. Adhere front, operating plate, same height requirements as rear plate.



- e. Applying nameplates without Heat: Roll Nameplates to fit curvature of extinguisher shell in nameplate roller. Remove adhesive backing and apply Loctite 454 (Part No. 449441) and align nameplate to proper height. Use a VHB or similar applicator roller to apply even pressure/remove bubbles. Minimum pressure of 15 psi (1.0 bar) for at least 5 seconds, verify edges are not lifting from shell.

NOTICE

It is recommended that heat and pressure be applied for 8 to 10 seconds to ensure adhesion of nameplate.

7. Leak Test

- a. Thread fill cap onto shell until gasket is compressed between cap and shell. Should be hand tight.
- b. Connect 240 psi (16.5 bar) (maximum) or 80 psi (5.5 bar) (minimum) pressure source through cartridge receiver, provide sufficient time for a leak to develop prior to testing.
- c. Submerge nozzle tip in water bath.
- d. Open pressure source to pressurize extinguisher.
- e. Spray soapy water solution around cartridge receiver and base of hose connection and fill cap indicator.
- f. Watch for bubbles/leak points for a minimum of 25 seconds at 240 psi (16.5 bar) or 75 seconds at 80 psi (5.5 bar).
- g. Tighten any leaking joint.
- h. Verify leak has stopped.
- i. Shut off pressure source.
- j. Remove nozzle from water and depressurize extinguisher by squeezing nozzle.
- k. Remove hose assembly from shell.

RED LINE EXTINGUISHER ASSEMBLY WORK INSTRUCTIONS (Continued)

8. Fill Shell with Agent

NOTICE

Select a dry, warm, preferably enclosed location, with atmospheric conditions of not more than 55% relative humidity and ambient temperature not less than 65 °F (18 °C). Dry Chemical must be kept tightly sealed and dry for performance. Moisture will cause dry chemical to form hardened clumps.

CAUTION

Phosphate based agents, FORAY dry chemical agent, should not be mixed with Bicarbonate based agents, Purple-K dry chemical agent. A chemical reaction that is harmful to the extinguisher will take place.

- Select proper agent per shipping assembly parts list or drawing.
- Wear PPE, Mask, and Glasses.
- Open pail using proper tool.



- Place suction hose into dry chemical pail for filling operation.



- Place shell onto fill station. Lower silo head. Zero the filling scale. Clamp hose elbow attachment to prevent dry chemical from entering hose during filling process.



- Place shell onto weighing scale and tare scale.
Note: Tare weight will be different for each size extinguisher.



SECTION 2 – RED LINE CARTRIDGE-OPERATED PORTABLE EXTINGUISHER

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Alternate Manufacturing Location - FHC
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RED LINE EXTINGUISHER ASSEMBLY WORK INSTRUCTIONS (Continued)

8. Fill Shell with Agent (Continued)

- g. Fill shell and verify weight is acceptable. Top off or remove chemical according to requirement.



- h. Verify weights for each model at work station and as in Table 2-4 below.

TABLE 2-4

Extinguisher	Weight Range
I-K-10-G	9.0 lb +0.5 / -0.0 lb
I-K-20-G	18.0 lb +1.0 / -0.0 lb
I-K-30-G	27.0 lb +1.0 / -0.0 lb
I-A-10-G-1	8.5 lb +0.5 / -0.0 lb
I-A-20-G-1	17.0 lb +1.0 / -0.0 lb
I-A-30-G-1	25.0 lb +1.0 / -0.0 lb

9. Clean Threads and Cap

- a. Using firm bristled brush, wipe inside threads clean. Ensure no powder in threads.



- b. Pull indicator stem into down position.



- c. Thread fill cap into shell until gasket is compressed between fill cap and shell collar. Should be hand tight. Torque to 120 in./lb.

10. Install Cartridge

- a. Remove shipping cap.
b. Weigh cartridge prior to installing with cap on.



- c. Check seal, reject if broken. Seal should only be blue in color and have the number 590 on it.



- d. Screw into cartridge receiver.



**RED LINE EXTINGUISHER ASSEMBLY
WORK INSTRUCTIONS (Continued)**

10. Install Cartridge (Continued)

- e. Hand tighten cartridge until seated against rubber gasket; approximately 4 complete turns.



- f. Align cartridge vertically.

11. Install Cartridge Guard

- a. Locate guard.
- b. Slide fork at bottom of guard over hose.

NOTICE

Do not depress push-lever on cartridge receiver.



- c. Clip guard around cartridge while holding cartridge receiver up. Place hose under cartridge receiver's push-lever against shell dome.

- d. Place nozzle in guard holster.



12. Insert Hose Seal (if needed)

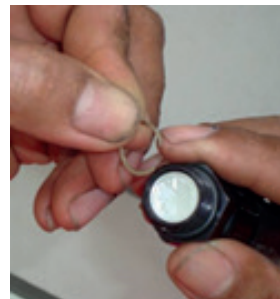
- a. Check seal pack content.
- b. Hose seal with clip and final seal with tie.



- c. Place hose seal into hose end.



- d. Use clip to secure seal in place.



**SECTION 2 – RED LINE CARTRIDGE-OPERATED
PORTABLE EXTINGUISHER**

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*Approved ANSUL® Assembly Manual for
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**RED LINE EXTINGUISHER ASSEMBLY
WORK INSTRUCTIONS (Continued)**

13. Install Final Seal

- a. Pull tie around hose and through slot in cartridge receiver lever.



- b. Crimp seal onto tie.



- c. Perform wheel pull test twice.

14. Record Serial Number

- a. Record and maintain records of serialized nameplates.
 1. Serial numbers must be documented per date of manufacture.
 2. Serial numbers must be documented per order.
 3. Records must be maintained.
- b. Any serialized nameplates that cannot be used for shipment must be destroyed and the serial number of each destroyed nameplate must be recorded.

15. Final Inspection

- a. Verify that:
 1. Handle works.
 2. Labels are straight.
 3. Labels are adhered on edges.
 4. Paint is not damaged.
 5. Indicator is down.
 6. Cap is torqued down to drawing specifications.



16. Package Extinguisher

- a. Close carton bottom.
- b. Place bottom insert into carton.
- c. Insert extinguisher into carton.
- d. Place top insert into carton.
- e. Add instruction manual to carton.
- f. Add Hanger Hook (Part No. 3651).
- g. Close carton.
- h. Place label on wide side of carton over printed artwork.

CARBON DIOXIDE EXTINGUISHER ENGINEERING CONSIDERATIONS

**(Not for Agency Field Representative's Use, Reference
UL File EX2199)**

Discharge Hose Assembly Test

No testing required, discharge hose assemblies are UL Component Recognized. Check the latest edition of Recognized Component Directory to verify that the hoses are Component Recognized with the proper marking.

Tamper Seal Pull Test

A spring scale is attached to the locking device or safety pin. The load shall be applied until the tamper indicator breaks, allowing the locking device to release or the safety pin to pull out. The load required to break the tamper indicator shall not exceed 15 lb (6.8 kg).

Finished extinguishers shall comply with the following:

TABLE 3-1: RATE OF FLOW (ROF) / DISCHARGE DURATION FOR CARBON DIOXIDE EXTINGUISHERS

Extinguisher Model	CO₂ Charge lb (kg)	ROF Duration (sec.)	Duration of Discharge (sec.)	Orifice Diameter in. (mm)	No. of Holes Nozzle
CD05A-1	5.0 ± 0.25 (2.27 ± 0.11)	10.0	10.0 ± 2.0	0.107 (2.72)	2
CD10A-1	10.0 ± 0.50 (4.55 ± 0.23)	10.0	10.0 ± 2.0	0.082 (2.08)	4
CD15A-1	15.0 ± 0.50 (6.8 ± 0.23)	11.0	11.0 ± 2.0	0.125 (3.18)	4
CD20A-1	20.0 ± 0.50 (9.07 ± 0.23)	13.0	13.0 ± 2.0	0.140 (3.56)	4

In general, the tolerances permit the extinguishers to be tested in temperatures somewhat below and above 70 °F (21 °C). If there is any doubt in regard to the duration, repeat tests should be conducted with units which have been stored at approximately 70 °F (21 °C) for 6 hours or more.

SENTRY CO₂ Model Discharge Duration Testing

- Two samples per model lots 500 and above.
Test frequency: per shift.
- One sample per model for low volumes under 500 pieces.
If multiple CO₂ models are made during a shift, then test one sample of the smallest and one sample of the largest capacity model. Test frequency: per shift.

SENTRY CO₂ Model Rate of Flow (ROF)

- Exempt, not required.

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TABLE 3-2: CARBON DIOXIDE EXTINGUISHER INSPECTION FORM

[illegible]

**RED LINE CARTRIDGE-OPERATED EXTINGUISHER
ENGINEERING CONSIDERATIONS**
(Not for Agency Field Representative's Use, Reference
UL File EX1216)

The Dry Chemical flow rate of these extinguishers, charged with their rated capacity and operated for the specified duration is as follows:

TABLE 4-1: ROF / DISCHARGE DURATION FOR RED LINE CARTRIDGE-OPERATED EXTINGUISHERS

Extinguisher Model	Dry Chemical Type	Dry Chemical Charge (incl. Fill Tolerances) lb (kg)	ROF Duration (sec.)	Flow Rate/sec. lb (kg)	Discharge Duration (sec.)	Nominal Orifice Diameter in. (mm)
I-A-10-G-1	Modified FORAY Agent	8.5 +0.5 / -0.0 (3.9 +0.2 / -0.0)	11	0.5 (0.23)	19.0 ± 2.0	0.170 (4.32)
I-A-20-G-1	Modified FORAY Agent	17.0 +1.0 / -0.0 (7.7 +0.5 / -0.0)	15	0.77 (0.35)	21.0 +2.0 / -1.0	0.209 (5.31)
I-A-30-G-1	Modified FORAY Agent	25.0 +1.0 / -0.0 (11.3 +0.5 / -0.0)	17	0.89 (0.40)	27.0 +2.0 / -1.0	0.221 (5.61)
I-K-10-G	Purple-K Agent	9.0 +0.5 / -0.0 (4.1 +0.2 / -0.0)	12	0.53 (0.24)	15.4 ± 2.0	0.161 (4.09)
I-K-20-G	Purple-K Agent	18.0 +1.0 / -0.0 (8.2 +0.5 / -0.0)	14	0.89 (0.40)	22.1 ± 2.0	0.209 (5.31)
I-K-30-G	Purple-K Agent	27.0 +1.0 / -0.0 (12.2 +0.5 / -0.0)	18	0.99 (0.45)	26.4 ± 3.0	0.221 (5.61)

In general, the tolerances permit the extinguishers to be tested in temperatures somewhat below and above 70 °F (21 °C). If there is any doubt in regard to the duration, repeat tests should be conducted with units which have been stored at approximately 70 °F (21 °C) for 6 hours or more.

RED LINE Dry Chemical Discharge Duration Testing

- Two samples per model lots 500 and above.
Test frequency: per shift.
- One sample per shift for low volumes under 500 pieces.
Test frequency: per shift.

RED LINE Dry Chemical Rate of Flow (ROF)

- Two samples of each model made anytime during week.
Test frequency: per week.
- **Exception:** if only one of a particular model is made, only one has to be ROF tested.

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*Approved ANSUL® Assembly Manual for
Alternate Manufacturing Location - FHC
(Form No. F-2018124)*

TABLE 4-2: RED LINE CARTRIDGE-OPERATED EXTINGUISHER INSPECTION FORM

[illegible]

BLUEPRINT REPORT - CONDENSED VERSION FOR FHC ONLY

Tyco Fire Products LP (WI) (1000000900)

FM CDL - Specific for FHC (REDA) Alternate Manufacturing Site

Original Project ID 3027640

Drawing No.	Revision Level	Drawing Title
435083	1	Nameplate, Maintenance, RED LINE, 10 lb FORAY
435110	1	Nameplate, Maintenance, RED LINE, 20 lb FORAY With CO ₂ Cartridge
435152	1	I-A-30-G-1 Nameplate
435099	6	ARABIC I A 10 G EXT Shipping Assembly
435127	4	ARABIC I A 20G EXT Shipping Assembly
435165	4	ARABIC I A 30G EXT Shipping Assembly
8832	3	10 CARTRIDGE
8833	5	20 CARTRIDGE
8834	4	30 CARTRIDGE
434905	0	Modified Tech FORAY Dry Chemical In Bins
73894	4	Arabic Operating Nameplate 10/20/30 Redline ABC
447583	1	Packaged Cartridge for FHC, UL split inspected (same as 8832 cartridge)
447584	1	Packaged Cartridge for FHC, UL split inspected (same as 8833 cartridge)
447585	1	Packaged Cartridge for FHC, UL split inspected (same as 8834 cartridge)
447593	2	MOD TECH FORAY for FHC in pails, UL split inspected (agent same as 434905)
30789	3	K-20-G, A-20-G-1 Nozzle Assembly, Complete
30778	3	K-30-G, A-30-G-1 Nozzle Assembly, Complete
31407	2	A-10-G-1 Nozzle Assembly, Complete
448011	1	I-A-10-G UNASSEMBLED ARABIC KIT
448012	1	I-A-20-G UNASSEMBLED ARABIC KIT
448013	1	I-A-30-G UNASSEMBLED ARABIC KIT
448081	0	AML CARBON DIOXIDE, BULK

BLUEPRINT REPORT - CONDENSED VERSION FOR FHC ONLY (Continued)

Tyco Fire Products LP (WI) (1000000900)

FM CDL - Specific for FHC (REDA) Alternate Manufacturing Site

Original Project ID 3026495

Drawing No.	Revision Level	Drawing Title
25374	15	INSTRUCTION MANUAL
416277	8	I K 20G EXT Maintenance Nameplate
418164	7	I K 30G EXT Maintenance Nameplate
418171	6	I K 10 G EXT Maintenance Nameplate
428227	7	ARABIC I K 10 G EXT Shipping Assembly
428229	6	ARABIC I K 20G EXT Shipping Assembly
428231	6	ARABIC I K 30G EXT Shipping Assembly
73893	3	ARABIC I K 10/20/30 G EXT Operating Nameplate
8832	3	10 CARTRIDGE
8833	5	20 CARTRIDGE
8834	4	30 CARTRIDGE
9342	7	PURPLE-K Dry Chemical In Bins
447583	1	Packaged Cartridge for FHC, UL split inspected (same as 8832 cartridge)
447584	1	Packaged Cartridge for FHC, UL split inspected (same as 8833 cartridge)
447585	1	Packaged Cartridge for FHC, UL split inspected (same as 8834 cartridge)
447591	2	PURPLE-K for FHC in pails, UL split inspected (agent same as 9342)
30787	3	K-10-G Nozzle Assembly, Complete
448008	1	I-K-10-G UNASSEMBLED ARABIC KIT
448009	1	I-K-20-G UNASSEMBLED ARABIC KIT
448010	1	I-K-30-G UNASSEMBLED ARABIC KIT
448081	0	AML CARBON DIOXIDE, BULK