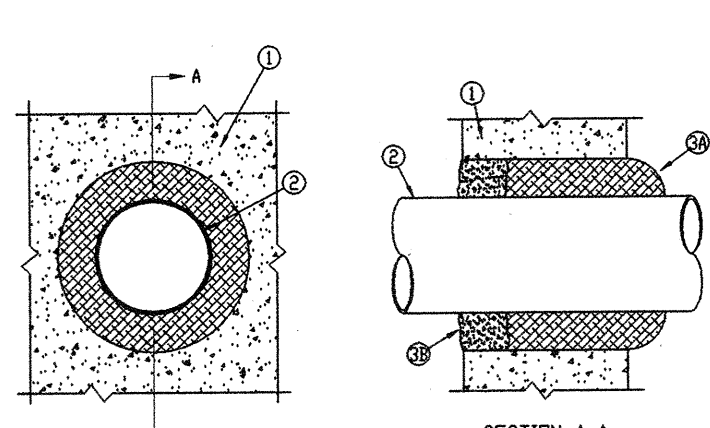


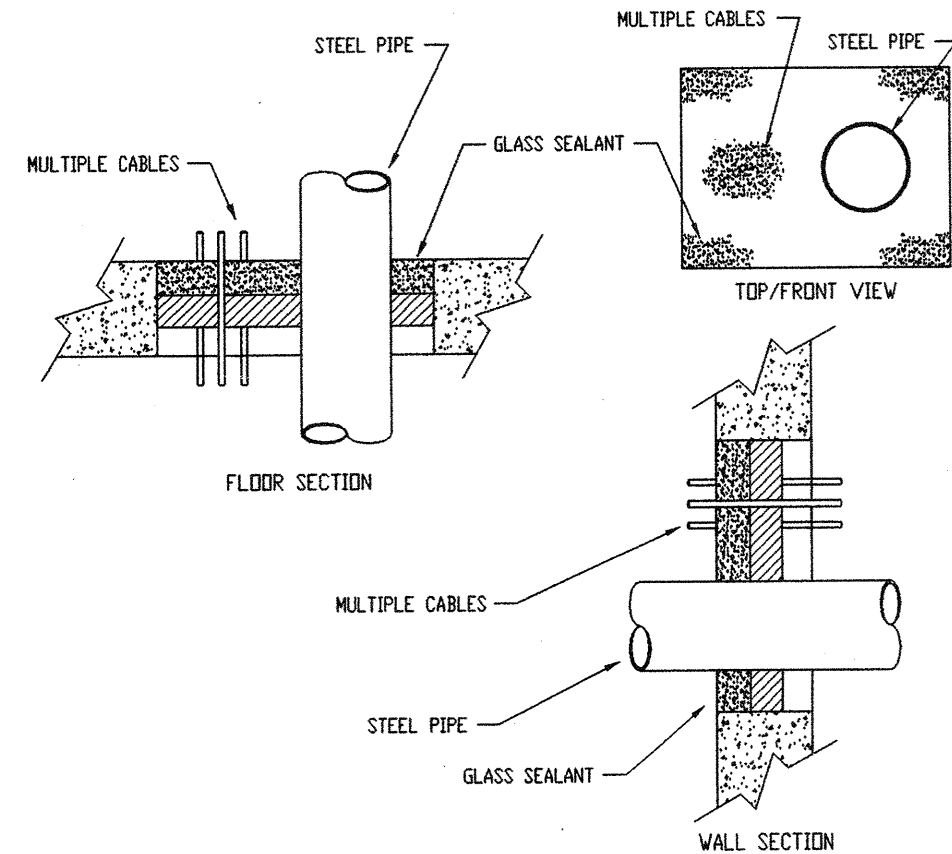
THROUGH-PENETRATION FIRESTOP SYSTEM DETAILS

NEW SYSTEM NO. CAJ1004
(OLD SYSTEM NO. 84)
F RATING - 3 HOUR
T RATING - 1/2, 3/4, 1, 1-1/2, 3 HOUR
(SEE ITEMS 2A, 3, AND 3A)



- FLOOR OR WALL ASSEMBLY - MIN 4-1/2 IN. THICK LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE OR MIN 6 IN. THICK CONCRETE BLOCK Laid up with mortar min 3 in. fire rated walls. MAX THROUGH OPENING SIZE IS 4 IN. DIAMETER (26x 26 IN.).
- STEEL PIPE OR CONDUIT - MIN 2 IN. DIAMETER SCHEDULE 40 (OR HEAVIER) STEEL PIPE OR STEEL ENT OR RIGID CONDUIT. CENTER IN OPENING AND RIGIDLY SUPPORTED ON BOTH SIDES BY THROUGH OPENING.
- CABLES - (NOT SHOWN IN LEGS OF STEEL PIPE OR CONDUIT) - CABLE LOADING SHALL BE 1.3 PER CENT. CABLES SHALL BE CENTERED IN THE THROUGH OPENING AND ONLY USED IN FLOOR CONFIGURATION (SEE ITEM 3A). THE FOLLOWING TYPES AND SIZES OF COPPER CONDUCTOR CABLES MAY BE USED:
 - MAX CONDUCTOR SIZE NO. 2 AWG MULTICONDUCTOR POWER AND CONTROL CABLE. CROSS-LINKED POLY-ETHYLENE (CLP) INSULATION AND PVC JACKET. WHEN MAX NO. 2 AWG MULTICONDUCTOR POWER AND CONTROL CABLES ARE USED, T RATING IS 1 HOUR. WHEN MAX NO. 12 AWG MULTICONDUCTOR CONTROL CABLES ARE USED, T RATING IS 1-1/2 HOURS. WHEN MAX NO. 14 AWG MULTICONDUCTOR CONTROL CABLES ARE USED, T RATING IS 3 HOURS.
 - MAX 100 PAIR TELEPHONE CABLE, PVC INSULATION AND JACKET. WHEN MAX 100 PAIR TELEPHONE CABLES ARE USED, T RATING IS 1-1/2 HOUR.
- FIRESTOP SYSTEM - INSTALLED WITH THE FOLLOWING COMPONENTS IN ACCORDANCE WITH THE INSTALLATION METHOD DESCRIBED BELOW. WHEN FIRESTOP SYSTEM IS INSTALLED IN WALL ASSEMBLY, T RATING IS 1/2 HOUR. WHEN CABLES (ITEM 2A) ARE USED, FIRESTOP SYSTEM TO BE INSTALLED IN FLOOR ASSEMBLY ONLY. WHEN CABLES (ITEM 2A) ARE USED, CERAMIC FIBER MUST BE PACKED FROM TOP SIDE OF FLOOR TO FILL ALL Voids AND INTERSTICES BETWEEN CABLES AND EXTEND MIN 2 IN. ABOVE THE SURFACE OF THE FLOOR.
 - PACKING MATERIAL - LOOSE CERAMIC FIBER, MIN 6 POF DENSITY OR MINERAL WOOL INSULATION MIN 6 POF DENSITY FIRMLY PACKED TO A DEPTH OF 3-1/2 IN. AND EXTEND A MIN OF 2 IN. BEYOND FACE OF ASSEMBLY. INSTALLATION TO BE PERFORMED FROM EITHER SIDE OF ASSEMBLY WHEN STEEL PIPE OR CONDUIT (ITEM 2) IS USED. WHEN CERAMIC FIBER OR MINERAL WOOL INSULATION IS PACKED FROM TOP SIDE OF FLOOR AND EXTENDS MIN 2 IN. ABOVE THE SURFACE OF THE FLOOR AND WHEN STEEL PIPE OR CONDUIT (ITEM 2) IS USED, T RATING IS 1/2 HOUR. WHEN CERAMIC FIBER OR MINERAL WOOL INSULATION IS PACKED FROM INSIDE OF FLOOR AND WHEN STEEL PIPE OR CONDUIT (ITEM 2) IS USED, T RATING IS 3/4 HOUR. WHEN CERAMIC FIBER OR MINERAL WOOL INSULATION MUST BE PACKED FROM TOP SIDE OF FLOOR TO FILL ALL Voids AND INTERSTICES BETWEEN CABLES AND EXTEND MIN 2 IN. ABOVE THE SURFACE OF THE FLOOR.
 - PUTTY FILL, VOID OR CAVITY MATERIALS - AFTER INSTALLATION OF PACKING MATERIAL (ITEM 2A) WHEN STEEL PIPE OR CONDUIT (ITEM 2) IS USED, THE PUTTY IS PACKED INTO OPENING TO FILL THE REMAINING VOID. PUTTY IS PACKED FLUSH WITH SURFACE OF ASSEMBLY. INSTALLATION TO BE PERFORMED FROM EITHER SIDE OF ASSEMBLY (SEE ITEM 3A). WHEN CABLES ARE USED, PUTTY IS PACKED TO FILL ALL Voids AND INTERSTICES BETWEEN CABLES AND TO FILL THE REMAINING OPENING OF THE UNDERSIDE OF THE ASSEMBLY.

NEW SYSTEM NO. CAJ8004
(OLD SYSTEM NO. 128)
F RATING - 1 HOUR



THE INFORMATION AND DATA CONTAINED HEREIN IS BASED UPON TESTING OF SPECIFIC SYSTEMS FOR ASTM E814, 1979 METHOD OF FIRE TESTS OF THROUGH-PENETRATION FIRE STOP SYSTEMS. UNDERWRITERS LABORATORIES' TEST CONDITIONS MAY NOT BE REPRESENTATIVE OF ACTUAL FIRE CONDITIONS. VARIATION FROM TESTED SYSTEMS MAY ALTER SYSTEM PERFORMANCE. FOR THESE REASONS, IT IS THE USER'S RESPONSIBILITY TO DETERMINE THAT THE SYSTEMS USED ARE SUITABLE FOR THE APPLICATION INTENDED AND WILL PROVIDE THE LEVEL OF PROTECTION DESIRED. SINCE APPLICATION OF THE PRODUCTS, CONDITION OF THEIR USE, AND THE INTENSITY AND DURATION OF ACTUAL FIRES ARE BEYOND ANY MANUFACTURER'S CONTROL, UNDERWRITERS SHALL NOT BE HELD LIABLE FOR DAMAGES, DIRECT OR CONSEQUENTIAL, RESULTING FROM THE USE OF ITS PRODUCTS OR TESTED DESIGNS. SUGGESTIONS OF USES SHOULD NOT BE TAKEN AS INDICATIONS TO INFRINGE ANY PARTICULAR PATENT.

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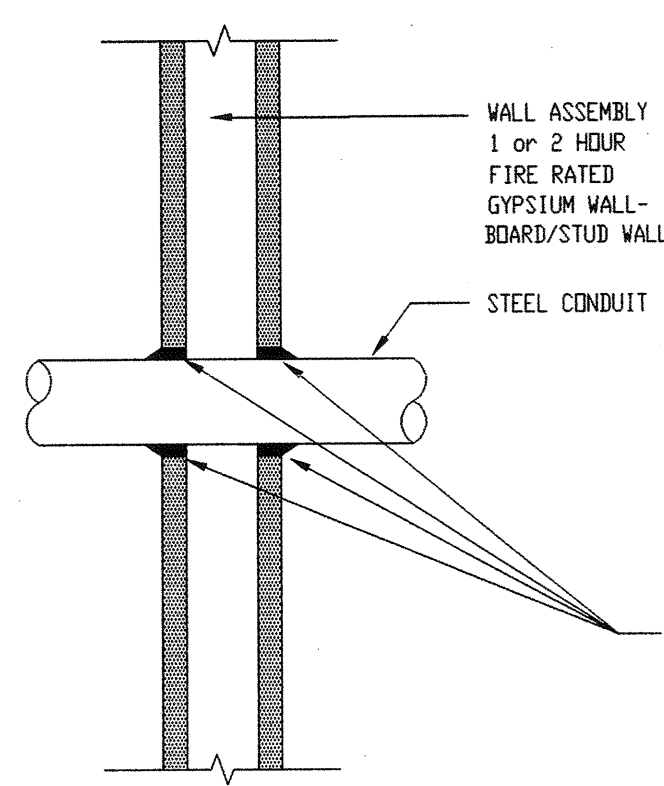
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PLEASE NOTE: SEE UNDERWRITERS LABORATORIES THROUGH-PENETRATION FIRESTOP SYSTEMS 128 FOR SPECIFIC DETAILS.

INFORMATION REFERENCE: LOW-CORNING DWG #08FSS-128

- NOTES:
- REFER TO THE SPECIFIC UL SYSTEM DETAILS CONTAINED HEREIN FOR THE MATERIALS.
 - SINGLE METAL PIPE - MAXIMUM 2" DIAMETER/CONCRETE FLOOR OR WALL SYSTEM NO. 84)
 - MULTIPLE PIPES, ALL METALLIC, CONCRETE FLOOR OR WALL SYSTEM NO. 128)
 - METALLIC PIPES - GVB PARTITION SYSTEM NO. 147)

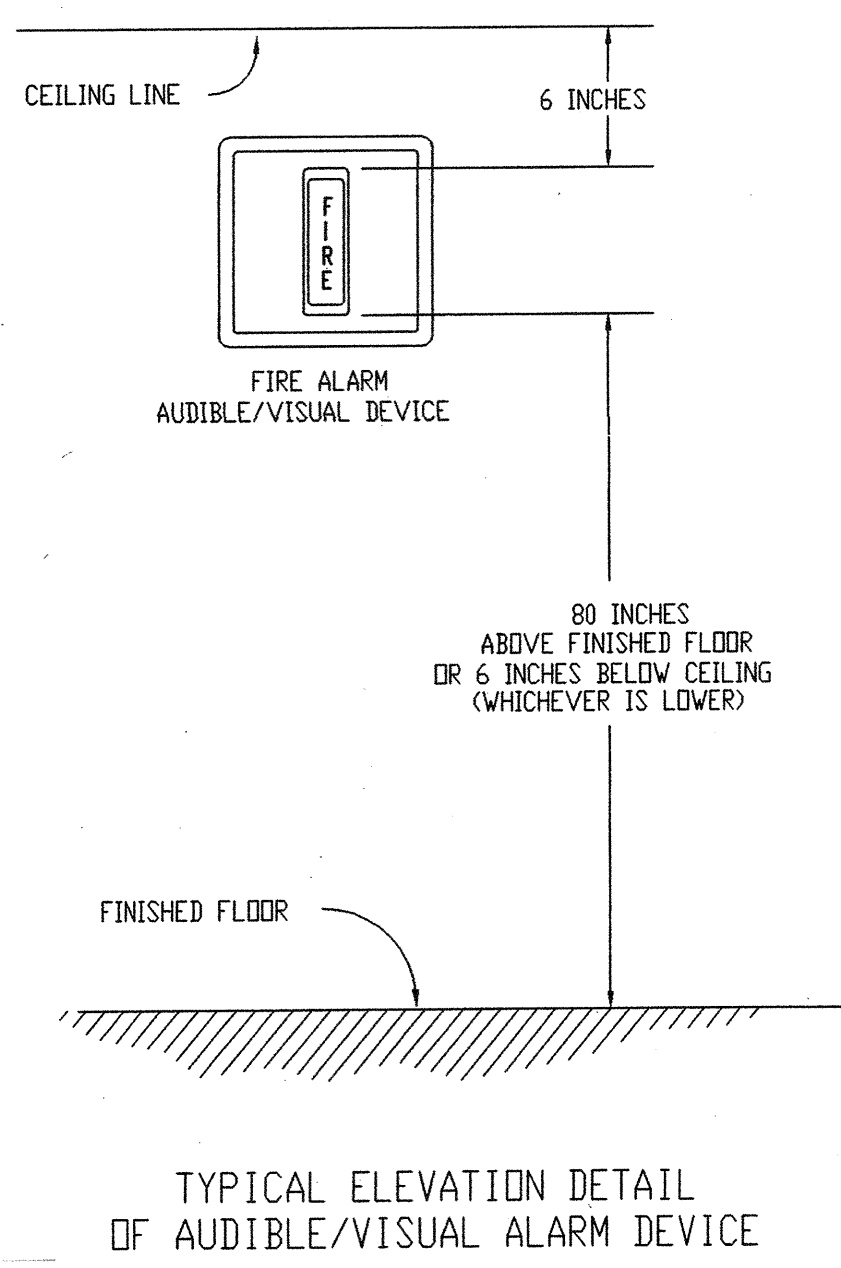
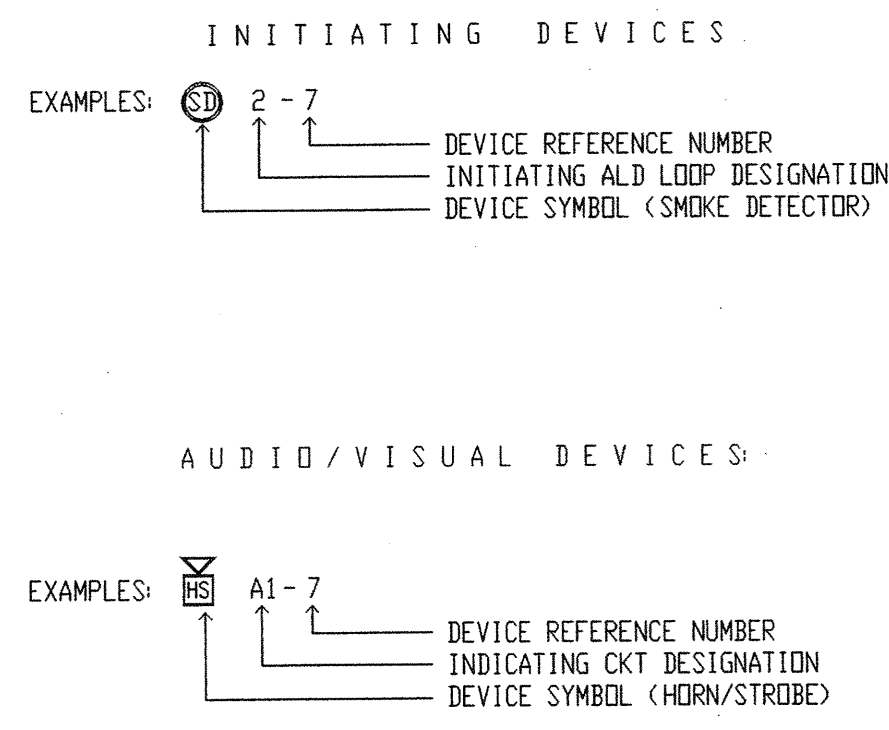
NEW SYSTEM NO. WL1001
(OLD SYSTEM NO. 147)
F RATING - 1 & 2 HOUR
T RATING - 0, 1, 1-1/2 & 2 HOUR



- SEAL ALL PENETRATIONS IN ACCORDANCE WITH APPLICABLE CODES TO PRESERVE ORIGINAL FIRE HOUR RESISTANCE OF WALLS, FLOORS OR CEILING. USE UL DIRECTLY ASSEMBLY NOS. 49 & 308, AS APPLICABLE FOR ALL FIRE WALL PENETRATIONS.
- AT FIRE SEPARATION WALLS, WRAP CONDUIT WITH 3M CONDUIT WRAP F3-195 TO WITHIN 1/4" OF OPENING, FILL THE GAP AND COVER EDGE OF WRAP WITH 3M-CP25 CABLE AND/OR #303 PUTTY.

TYPICAL ELEVATION DETAIL OF MANUAL PULL STATION

DEVICE DESIGNATION LEGEND



TYPICAL ELEVATION DETAIL OF AUDIBLE/VISUAL ALARM DEVICE

SYMBOL	DESCRIPTION	CSDM LISTING #	REMARKS
[FSCP]	KIRKLAND FIREMAN'S SMOKE CONTROL PANEL # BORAD-D-32	7120-1178-100	EXISTING
[CTC]	FIRE ALARM TERMINAL CABINET (PROVIDED BY OTHERS) (EXISTING)		EXISTING
[PAD-2 #3A]	AUXILIARY POWER SUPPLY PANEL (PAD-2)	7300-0067:175	EXISTING
[E]	ADDRESSABLE MANUAL PULL STATION (MSI-20B) PYROTRONICS	7150-0067:036	
[S]30cd	24 VDC STROBE 30 CANDELA (RSS-2430W-FR) WEELOCK	7125-0785:141	
[S]75cd	24 VDC STROBE 75 CANDELA (RSS-2475W-FR) WEELOCK	3240-0067:116	
[D]	DUCT DETECTOR HOUSING WITH RELAY, ADDRESSABLE PHOTO TYPE DETECTOR AND SAMPLING TUBE (AD-31LP) PYROTRONICS	7125-0785:141	
[H]15cd	24 VDC HORN/STROBE 15 CANDELA (NS4-2415W-FR) WEELOCK	7125-0785:142	
[H]30cd	24 VDC HORN/STROBE 30 CANDELA (NS4-2430W-FR) WEELOCK	7125-0785:142	
[H]75cd	24 VDC HORN/STROBE 75 CANDELA (NS4-2475W-FR) WEELOCK	7125-0785:142	
[J]	JUNCTION BOX (BY OTHERS)		
[E]	DENOTES EXISTING		
[W.P.]	WEATHERPROOF		
[N]	DENOTES NEW		

WIRING LEGEND

SYMBOL	WIRE TYPE	USED ON
[IA]	2-CONDUCTOR, #16 AWG SOLID TWISTED SHIELDED CABLE	ADDRESSABLE ALARM INITIATING DEVICES - ILP-SERIES SMOKE DETECTORS - TRI-SERIES INTERFACE MODULES - AD-SERIES DUCT DETECTORS - MSI-SERIES PULL STATION
[IB]	2-CONDUCTOR, #12 AWG SOLID	FACP OR PAD-2 24 VDC POWER TO - STROBE CIRCUIT
[IC]	2-CONDUCTOR, #12 AWG SOLID	FACP OR PAD-2 24 VDC POWER TO - HORN CIRCUIT
[ID]	2-CONDUCTOR, #16 AWG SOLID TWISTED SHIELDED CABLE	MXL NETWORK WIRING
[IE]	2-CONDUCTOR, #14 AWG THIN STRANDED	TRI TO MONITORED DEVICES: - TAMPER SWITCH - WATERFLOW SWITCH - FAN INTERFACE WIRING
[IF]	2-CONDUCTOR, #12 AWG SOLID	24 VDC POWER
[I]	2-CONDUCTOR, #12 AWG SOLID (GROUNDED WIRE)	120 VAC POWER

VOLTAGE DROP CALCULATIONS

VOLTAGE DROP FOR A GIVEN LENGTH OF CONDUCTOR = $\frac{1 \times \text{FEET} \times 21.6}{\text{C.M.}}$

WHERE: 1 = AMPERES PER TERMINAL OF LOAD
FEET = ONE WAY DISTANCE IN FEET MEASURED FROM SOURCE OF SUPPLY TO LOAD
21.6 = CONSTANT RESISTANCE OF CONDUCTOR @ 10.8 OHMS PER L.M. FOR TWICE THE LENGTH
C.M. = CROSS SECTIONAL AREA IN CIRCULAR MILS (SEE CHART BELOW)

WIRE SIZE (AWG)	12	14	16	18	20
CIRCULAR MILS (C.M.)	6530	410	2580	1620	1020

LONGEST AUDIBLE CIRCUIT - CKT 8V1
APPROX. LENGTH OF CONDUCTOR - 400 FEET
TOTAL CURRENT LOAD FOR CKT A1 - 805 Amps

VOLTAGE DROP = $\frac{0.805 \times 400 \times 21.6}{6530} = \frac{6955}{6530} = 1.1$ VOLTS

% OF VOLTAGE DROP = $\frac{1.1 \text{ VOLTS}}{24 \text{ VOLTS}} = .046$ OR 4.6%

THUS, THE 1.1 VOLTS DROP IS WITHIN THE DEVICE OPERATING VOLTAGE RANGE.
NOTE: THE OPERATING VOLTAGE OF THE AUDIBLE/VISUAL SIGNALS USED IS 18 TO 31 VDC.

GENERAL ELECTRICAL NOTES

- ALL WIRING MUST CONFORM WITH SPECIFICATIONS, CALIFORNIA ELECTRICAL CODE (CURRENT EDITION), DRAWINGS AND LOCAL CODES.
- ANY DEVIATION FROM THE DESIGN AND LOCATION OF EQUIPMENT SHOWN MUST FIRST HAVE A WRITTEN APPROVAL FROM CERBERUS-PYROTRONICS. ANY DEVIATION FROM DESIGN MUST ALSO BE INDICATED ON CERBERUS-PYROTRONICS SHEET DRAWINGS (BLUEPRINTS) AND RETURNED TO CERBERUS-PYROTRONICS AT TIME OF JOB COMPLETION.
- ALL INSTALLATION MATERIALS SUCH AS CONDUITS, FITTINGS, JUNCTION BOXES, TERMINAL CABINETS, PULL BOXES, HANGERS, ETC ARE NOT SUPPLIED BY CERBERUS-PYROTRONICS.
- INITIATING DEVICE AND AUDIBLE ALARM DEVICE POLARITY MUST BE OBSERVED.
- ALL INDICATING CIRCUIT WIRES MUST BE SUPERVISED. HENCE, NO PARALLEL BRANCHING OF WIRES IS PERMISSIBLE.
- WIRE RUNS ON FLOOR PLANS ARE SHOWN DIAGRAMMATICALLY. EXACT LOCATION OF ALL WIRES RUNS TO BE DETERMINED IN FIELD.
- ALL PLUG-IN TYPE DETECTORS REQUIRE A 4" OCTAGONAL, 1-1/2" OR DEEPER MOUNTING BOX.
- IONIZATION SMOKE DETECTORS SHALL NOT BE LOCATED IN DIRECT AIR STREAM FROM SUPPLY AIR OUTLETS.
- DO NOT APPLY 120 VAC POWER TO CONTROL PANEL UNTIL A CERBERUS-PYROTRONICS SERVICE TECHNICIAN HAS INSPECTED ALL SYSTEM WIRING CONNECTIONS AND HAS APPROVED THE SYSTEM TO BE TURNED ON.

STATEMENT OF WORK

- MODIFY THE EXISTING FIRE ALARM SYSTEM TO ACCOMMODATE THE NEW DEVICES.
- THE NEW FIRST FLOOR DEVICES (PARTIAL REMODEL)
- WORK SHALL BE POWERED BY EXISTING SIGNAL POWER EXPANDERS.

SIGNAL SYSTEM NOTES

- ALL WIRING SHALL BE IN CONDUIT, U.O.N. MINIMUM CONDUIT SIZE SHALL BE 3/4".
- PROVIDE AND INSTALL ALL CONDUIT, BOXES, CONDUCTORS, POWER SUPPLY, RELAYS, ZONE MODULES, CARDS, SWITCHES ETC. FOR A COMPLETE AND OPERABLE FIRE ALARM, CLOCK, TELEPHONE INTERCOMMENTS.
- ALL CABLES COMING INTO THE STC OR FIC ONS SHALL TERMINATE TO TERMINAL BLOCKS OR RAIL MOUNTED TO THE CAN.
- ALL REQUIREMENT OF CONTRACT SPECIFICATIONS AND DRAWING APPLY.
- INSTALLATION SHALL CONFORM TO REQUIREMENTS OF APPLICABLE ELECTRICAL CODES.
- TEE-TAP INSIDE BUILDING IN JUNCTION BOX. USE TERMINAL BLOCKS.
- FIRE ALARM FIELD WIRING SPECIFICATIONS FOR ADDITIONAL INSTALLATION REQUIREMENTS.
- 120VAC 60Hz INPUT POWER FOR FIRE ALARM CONTROLS SHALL BE A DEDICATED, LOCKING BREAKER PROPERLY LABELED SOURCE FROM LINE OF MAIN DISCONNECT OR "EMERGENCY POWER"
- ALL WIRING INCLUDING SHIELDS MUST BE DRY AND FREE OF SHORTS AND GROUNDS.
- 120VAC IS NOT PERMITTED IN SAME CONDUIT WITH LOW VOLTAGE WIRING.
- DO NOT APPLY POWER EXCEPT IN THE PRESENCE OF A FACTORY-TRAINED FIRE ALARM TECHNICAL REPRESENTATIVE.
- THERE WILL BE NO CONDUIT ENTRY ALLOWED 18" OR LOWER ON THE SIDE PANELS OR THROUGH THE BOTTOM OF ALL CONTROL EQUIPMENT BOXES.
- ALL VISUAL ALARM IN THE MULTI-USE ROOM, SHALL BE SYNCHRONIZED.
- VISUAL DEVICE SHOULD NOT EXCEED 3 FLASHES PER SECOND AND SHOULD NOT BE SLOWER THAN 1 FLUSH EVERY SECOND. THE DEVICE SHALL HAVE A PULSING LIGHT SOURCE NOT LESS THAN 75 CANDELA. NO PLACE IN ANY ROOM SHALL BE MORE THAN 50 FT. FROM THE DEVICE.
- UNDERGROUND AND EXTERIOR CONDUITS TO HAVE WATER-TIGHT FITTINGS AND WIRES TO BE APPROVED FOR THE LOCATION.
- ALL WIRE, PANEL AND DEVICE TERMINATION, CONDUIT, PHYSICAL MOUNTING, ETC. SHALL BE PROVIDED BY OTHER FIRE ALARM SYSTEM MANUFACTURER.
- ALL EXISTING CLOCKS AND SPEAKER SHOWN SHALL BE DISCONNECTED AND REMOVED AND TURNED OVER TO THE SCHOOL DISTRICT.
- EXISTING MASTER INTERCOM/MUNICATION SYSTEM SHALL BE REMOVED AND TURNED OVER TO THE SCHOOL DISTRICT.
- ALL NEW COMBINATION CLOCK AND SPEAKER DEVICES SHALL BE INSTALLED SURFACE MOUNTED ABOVE BLACKBOARD IN THE CLASSROOM.
- AUDIBLE DEVICE(S) TO BE AT LEAST 15 DBA ABOVE THE EQUIVALENT SOUND LEVEL BUT NOT LESS THAN 75 DBA AT 10' OR MORE THAN 100 DBA AT THE MINIMUM HEARING DISTANCE.
- AUDIBLE DEVICE SHALL SOUND THE CALIFORNIA UNIFORM FIRE ALARM SIGNAL.
- WITNESS OF FINAL ALARM TEST BY LOCAL FIRE AUTHORITY AND PROJECT INSPECTOR.

APPLICABLE CODES

- 1995 BUILDING STANDARDS ADMINISTRATIVE CODE PART 1, TITLE 24 C.C.R.
 - 1995 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 C.C.R.
(1994 UNIFORM BUILDING CODE VOLUME 1-3 AND 1995 CALIFORNIA AMENDMENTS).
 - 1995 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 C. C. R.
(1993 NATIONAL ELECTRICAL CODE AND 1996 CALIFORNIA AMENDMENTS).
 - 1995 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 C. C. R.
(1994 UNIFORM MECHANICAL CODE AND 1995 CALIFORNIA AMENDMENTS).
 - 1995 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 C. C. R.
(1994 UNIFORM FIRE CODE AND 1995 CALIFORNIA AMENDMENTS).
 - 1995 CALIFORNIA FIRE CODE (CFC), PART 5, TITLE 24 C. C. R.
(1994 UNIFORM FIRE CODE AND 1995 CALIFORNIA AMENDMENTS).
 - 1995 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24 C. C. R.
 - 1990 TITLE 19, C.C.R. PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS
- PARTIAL LIST OF APPLICABLE NFPA STANDARDS:
- | STANDARD | EDITION |
|--|---------|
| NFPA 13 - AUTOMATIC SPRINKLER SYSTEMS | 1994 |
| NFPA 14 - STANDPIPE SYSTEMS | 1993 |
| NFPA 17A - WE CHEMICAL SYSTEMS | 1990 |
| NFPA 24 - PRIVATE FIRE MAINS | 1992 |
| (CALIFORNIA AMENDED) NFPA 72 - NATIONAL FIRE ALARM CODES | 1993 |
| NFPA 253 - CRITICAL RADIANT FLUX OF FLOOR COVERING SYSTEMS | 1989 |
| NFPA 2001 - CLEAN AGENT FIRE EXTINGUISHING SYSTEMS | 1994 |
- REFERENCE CODE SECTION FOR NFPA STANDARDS - CBC (SFM) 3503.1.3

SEQUENCE OF OPERATION

- ACTUATION OF ANY PULL STATION:
 - LIGHT CIRCUIT LED AT CONTROL PANEL DESIGNATING THE CIRCUIT INVOLVED.
 - SEND ALARM SIGNAL TO CENTRAL MONITORING STATION.
 - ACTIVATE ALL HORNS, HORN/STROBES AND STATION.
- ACTUATION OF ANY SMOKE DETECTOR SHALL:
 - PERFORM FUNCTIONS SPECIFIED FOR MANUAL PULL STATION.
 - SYSTEM OPEN OR SHORT-CIRCUIT AND GROUND FAULT SHALL:
 - SOUND TROUBLE ALARM AND LIGHT TROUBLE LED AT THE FIRE ALARM CONTROL PANEL.

NOTE:

THE EXISTING FIRE ALARM PANEL AND SYSTEM WAS APPROVED UNDER DSA APPLICATION #01-100317 SCOPE OF WORK ON THESE DRAWINGS IS LIMITED TO ADDITION OF AUDIO/VISUAL AND INITIATING DEVICES (SHOWN ON EF-2.0) TO EXISTING FIRE ALARM PANEL AND SIGNAL POWER EXPANDERS.

REGISTERED PROFESSIONAL ELECTRICAL ENGINEER
STATE OF CALIFORNIA
15782
11/11/01
Ren. 11/01

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CENTER FOR ADVANCED LEARNING TECHNOLOGY
SKYLINE COLLEGE
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SAN BRUNO, CALIFORNIA 94068
3300 COLLEGE DRIVE

NO.	DESCRIPTION	DATE	BY
	DSA SUBMITTAL	06/15/01	
	REVISION		

DRAWN O.G.
CHECKED DK
DATE 03/21/01
JOB NO. 98-03

SHEET TITLE
FIRE ALARM EQUIPMENT LIST
DETAILS & INDEX

SHEET
EF-1.0