

GENERAL SPECIFICATIONS - TEST LABORATORY

UTILITY INSTRUMENTATION

REPORT TO PROJECT M - NO. ABA-16

STANFORD UNIVERSITY SUBCONTRACT S-128

UNDER A.E.C. CONTRACT AT(04-3)-363

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GENERAL SPECIFICATIONS - TEST LABORATORYUTILITY INSTRUMENTATION

The following general specifications cover the equipment and material to be used in the utility instrumentation systems for the Test Laboratory.

All electrical wiring shall be in accordance with applicable local and national codes. The conduits leaving the building shall be stubbed five feet from the building. The cable and conduit materials and installation shall be in accordance with the electrical specification.

The painting and metal work shall be in accordance with the painting and fabrication specifications.

The mechanical piping and tubing material and installation shall be in accordance with the piping specification.

The systems covered by this general specification are the Fire Detection and Monitor System, Hydrogen Detection System, and the Communication Systems.

#### I. FIRE DETECTION AND MONITOR SYSTEM

The fire detection and monitor system comprises all of the following components, although the detectors, control unit, alarm horns, detector tubing, water flow detector, and manual alarm station are charged to the Test Lab system cost. The annunciator and master fire alarm box are installed in a remote location from the Test Lab. Therefore, the cost of materials and labor is charged to the site work. The cost for the tie-in with the telephone system will be charged to the site. The system shall be installed in accordance with Drawing Nos. SK-L620, SK-L621, SK-L622, SK-K624, and SK-K625.

##### A. Detectors

1. Rate of rise detectors, with actuation at approximately 15 degrees per minute temperature rise. - The operation of this type of unit is by

expansion of heated air within the tubing, in turn expanding the diaphragm carrying the contact which closes for an alarm signal.

2. Fixed temperature detectors with fixed temperature ranges between 135 and 225 degrees. - Selection of a specific temperature will be determined by the normal heat generating equipment within the vicinity of the detectors.

B. Control Unit

The control unit shall be capable of receiving local fire alarm signals from detectors or manual alarm stations and shall have provisions for remote transmission to the master fire alarm box.

C. Manual Alarm Station

Manual alarm stations in building interior shall be of the surface type mounting and shall have two heavy duty contacts rated at 2 amps, 115V ac.

D. Master Fire Alarm Box

The master fire alarm box shall be capable of receiving alarms originating at remote fire alarm stations, fire detectors, or building sprinkler systems; transmitting the signal to the designated fire stations and other remote points as required; automatic grounding to form a complete circuit in the event of a broken line; and being tested for electrical and mechanical malfunctions without disrupting the circuit or removing any wiring.

E. Annunciator

The annunciator shall be used in conjunction with the master fire alarm box to direct fire fighting personnel to the originating point of alarm and shall be of the weatherproof type with indicator lights for each zone as required.

SLAC AHO 1991-012B14

F. Alarm Horns

Alarm horns shall be of the vibrating type. Operating voltage shall be nominal 24 volts dc. Horns shall have a normal output of 101 to 110 db at 10 feet with manual regulation to lower levels.

G. Detector Tubing

Detector tubing shall be 1/8" O.D. copper.

H. Water Flow Detectors

The water flow switch used with the sprinkler system shall be of the retard alarm type to avoid false alarms from fluctuations of pressure and flow in water mains. A steady flow for a period determined by the setting of the retard device will cause an alarm. The retard device shall be adjustable for any period of time up to one minute. Pipe size connections for the flow switches will be determined during the design of the sprinkler system.

J. Wiring

All wiring between components shall be installed in conduit.

II. HYDROGEN DETECTION SYSTEM

A. Monitor Rack

The monitor rack shall be a panel composed of four 3-way solenoid valves which will open successively every 15 seconds to allow an air sample to flow to the detector unit. Pilot lights on the front of the panel shall be used for station sampling indication. Push buttons shall be a portion of the panel to allow uninterrupted sampling of a specific area.

B. Blowers

Blowers shall be of the continuous duty type with suction of 1200 feet

at a minimum velocity of 6 feet per second through 3/8" O.D. tubing.

C. Tubing

Tubing shall be 3/8" O.D. copper.

D. Detection Unit

1. The detection unit shall be capable of detecting the limit of maximum acceptable concentration of hydrogen gas. Operation of the unit shall be such that the sample stream passes across a heated filament that is one resistance arm of a wheatstone bridge. Increased temperature of the filament by combustible gas will cause an output voltage proportional to the concentration of combustible gas.

2. Local warning lights and audible alarm shall be activated when excessive hydrogen gas is detected. Contacts shall be incorporated into the unit for the external functions.

IV. COMMUNICATIONS

The communications systems will consist of the conduit for the telephone system and the intercom system.

A. Telephone System

The telephone system will consist of the installation of conduits, pull boxes, and terminal cabinets. The cable, terminal boards, switchboards, dial equipment and auxiliary relays will be furnished and installed by others. The pull boxes, conduit, and terminal cabinets shall be installed as noted on Drawing Nos. SK-L620, SK-L621, SK-L622, and SK-L624.

B. Intercom and Public Address System

The conduit, only for these systems, shall be installed in accordance

with Drawing No. SK-I620. The source of the conduit shall be in the Test Laboratory in the immediate vicinity of the test accelerator console. The conduit shall be stubbed five feet external of the building.

#### V. ACCELERATOR MONITORS AND CONTROLS

The conduit, only for the systems and sub-systems, shall be installed in accordance with Drawing No. SK-I620. The cable and control console will be installed by others. The source of the conduit shall be in the Test Laboratory in the immediate vicinity of the test accelerator console. The conduit shall be stubbed five feet from the external wall of the Test Laboratory.

SLAC AHO 1991-012B14