viewing room to enable two people, in addition to the Operator, to view clearly the on-site monitor which displays the survey as it proceeds.

C. The viewing room shall be equipped with factory installed air-conditioning units capable of both cooling and heating.

D. The working area shall be reserved for equipment, both operational and stored, and no equipment utilised within the pipe shall be allowed to be stored in the viewing area.

E. The surveying equipment shall be capable of surveying a length of pipe up to 200 m in one continuous operation. The Contractor shall maintain his equipment on site in full working order and shall satisfy the Engineer at the commencement of each working shift that all items of equipment have been provided and are in full working order.

F. Each survey unit shall contain a means of transporting the CCTV survey equipment in a stable condition through the pipe under inspection. Such equipment shall ensure the maintained location of the CCTV survey equipment on or near to the central axis of a circular shaped pipe.

G. Where the CCTV survey equipment is towed by winch and bond through the pipe, all winches shall be stable with either lockable or ratcheted drums. All bonds shall be steel or of an equally non-elastic material to ensure the smooth and steady progress of the CCTV survey equipment. All winches shall be inherently stable under loaded conditions.

H. Each unit shall carry sufficient numbers of guides and rollers such that, when surveying, all bonds are supported away from pipe and manhole structures and all CCTV cables and/or lines used to measure the equipment's location within the pipe are maintained in a taut manner and set at right angles, where possible, to run through or over the measuring equipment.

I. Surveying equipment should be capable to survey minimum length of 200m for gravity pipelines but it should be capable to survey much longer lines in case of pressure mains.

28.3.5 CCTV Survey and Deflection Measurements

A. Wherever prevailing conditions allow, the survey equipment shall be positioned to reduce the risk of view distortion. The survey equipment lens shall be positioned centrally within the pipe. In all instances the survey equipment lens shall be positioned looking along the axis of the pipe. A positioning tolerance of ±10% of the vertical pipe dimension shall be allowed.

B. The speed of the survey equipment in the pipe shall be limited to 0.1 m/s for pipes of diameter less than or equal to 200mm, 0.15m/s for diameters greater than 200mm but less than or equal to 300mm and 0.2m/s for diameters greater than 300mm, or such other speed as agreed by the Engineer to enable all details to be extracted from the video tape recording.

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