

Scope of Work covered under

All in Comprehensive Maintenance & Service Contract

The contractor shall be responsible for engaging adequately trained personnel required for providing good maintenance services.

- (1) The staff of the contractor should possess sound health and be free from and diseases, especially contagious and frequently recurring diseases.
- (2) The contractor shall make his own arrangements for security and protection of his men and materials and the completed work till the same are taken over by the Department.
- (3) For repairing & maintenance works, the quoted rates shall be inclusive of all Materials, labors, Transportation & Packings, Preparation of surfaces, scaffolding, if any execution of works as per the specifications and directions of the Engr. In Charge.
- (4) The contractor has to obtain (I-Cards as prescribed) for all workers etc. for carrying out the work and permission to work, if works are to be carried out on Saturday / Sunday/Holiday & during night also.
- (5) The contractor has to obtain working passes from department of the office to carry out the work at the Campus.
- (6) The Agency should have been registered by the competent authority and' should have PAN number, Service tax registration, Registration of the Agency under the Shops & Establishment Act, License under the Contract Labour Act, PF registration with the Regional PF Commissioner, ESI Registration, Workmen Compensation Policy as applicable.
- (7) Maintaining the Lift to keep the equipment properly adjusted and in proper safe operating condition by regular and systematically examining, adjusting, lubricating all parts / components, including warranted repairs of replacement of machine, motor generator, controller and parts as required including worm gears, thrust, bearings, break magnet coils or brake motors, brake shoes, brushes, winding, commentators, rotating elements contacts, coils, resistance for operating and motor circuits, magnet frames and other mechanical part due to wear and tear, using only genuine and original parts (Manufactures invoice / Mark on parts shall be the proof the party being genuine, use of in genuine parts with incorrect invoice, marks will be considered as breach of contract.) Mark of

parts and components will be got approved, if the original figments of manufacturer's do not exit.

(8) Renewing guide shoes ribs or guides rails when necessary to ensure smooth and quiet operation and to keep the guide rails properly lubricated.

(9) Renewing all wire ropes as often as necessary to maintain the adequate factor of safety to equalize the tension on all hoisting ropes and repairing or replacing conductor cable.

(10) EQUIPMENT COVERED:

(a) Repair / Renew all wire ropes and chains (Where fitted) as often as required to maintain an adequate factor of safety, to equalize the tension on all hoisting ropes, repair or replace conductor cables and hoist way and machine room elevator wiring.

(b) Systematically examine and adjust the following components:

- Machine, Worm, Gear, Thrust Bearing, Drive Sheave, Drive Sheave Bearing, Brake Contact, Linings and Components;
- Motor, Motor Windings, Rotating Elements, Holders, Bearing, Coils, Resistance for Operating and Motor Circuits, Magnet Frames and other Mechanical Parts;
- Controllor, Selector, Leveling Devices, Cams, Relays, solid state components e.g. PCBs, Transducers, Resistors, Condensers, Power Amplifiers, Transformers, Contacts, Leads, Dashpots, Timing Devices and Mechanical and Electrical Driving Equipment;
- Governor, Governor Sheaves, shaft Assembly, Bearings, Contacts and Governor Jaws;
- Car and Hall Mechanical Buttons, Car and Position Indicators, Hall Lanterns, Car Direction Indicators and all other Car and Landing Signal Fixtures.
- Changing of ARD Batteries periodically, Car Cabin Fan , Car Ceiling Lights, Intercom/Phone ,TFT Screen Replacing by Any Damages like theft, aging effect, Broken by any materials or there sources are in Scope of Lift AMC work. No extra Payment given by this Office.
- Deflector or Secondary Sheave, Bearings, Car and Counterweight Guide Rails and Buffers, Top and Bottom Limit Switches, Governor Tension Sheaves

Assembly, Compensating sheave Assembly, Car, Counterweight and Counterweight Guide Shoes including rollers or gibbs.

- Interlocks on Hoist way Door, Hoist way Door Hangers, Guides, Automatic Power Operated Door Operator, and Car Door Hanger, Car Door Contact, Safety Shoes, Load Weighing Equipment, Car Frame, Car Safety Mechanism and platform.

- (c) Furnish lubricants compounded to as per stringent specifications.
- (d) Examine periodically all safety devices and governors and make all customary safety tests.
- (11) Maintenance of hung ceiling light diffusers. Light tubes and bulbs. Mirrors and cabin fans are included in the scope of agency.
- (12) Lubricating, servicing and checking of all components which should be done minimum once in a month. The Executive Engineer/ Deputy Executive Engineer/ Engineer-in-charge can call back the service of repairing crew any time during the month, during regular working hours as well as during overtime hours and it will be obligatory on the part of agency to respond within 24 hours after registration / intimation of call back. The Emergency Rescue devices and Emergency Lights including Batteries are covered under Annual Maintenance Contract for any Kind of repair or replacement during the maintenance period.
- (13) Servicing, repairing and replacement of spare parts, etc. should be carried out with the knowledge of authorized representative/s of Electrical Division and his signature should be obtained in token of works carried out.
- (14) Preventive repairs shall be attended to in a phased program and the Section Officer In charge shall notify such maintenance closures to public.
- (15) The contractor shall as far as possible, attend the call of the Engineer In charge quickly for such of these items which are required to be done under the terms of contract. If no response to attend the call is for the coming from the contractor within 48 hours till the report undertaking the work, recovery calculated on hourly rate basis for the service contract would be recovered from him.
- (16) Renewal of Lift Licenses documentation, liaison, and necessary renewal fee is in scope of AMC work.

(17) The lifts under contracts should function satisfactory for the entire period of contract. The lift installed shall be inspected once in three months by the Senior Engineer Personal of the firm jointly with the Deputy Executive Engineer, Nadiad R & B Electrical Sub Division, Nadiad suggestion and premedical measures to bottle-neck, if any and for better functioning be sorted out the lift working days are considered as 365 days per year and stoppage on account of maintenance and repairs are allowed at 25 days in a year. The liquidated damages for closure for any more period, then stipulated above shall be recovered Rs. 15.00 per day on daily rated basis by dividing the annual contract price 365 days.

- Maximum recovery will be 20% of the contract value If contractor does not attend the lift within 10 days, then these 10 days will be considered as notice period for termination of contract for public interest.
- After corned out all in service work satisfactory the contractor shall have to submit to bill/invoice for the period for which all in service carried out. Payment will be made on availability of grant.
- The accepting authority or the Executive Engineer in charge of the work reserves the right to terminate and/or suspend the contract at any time after giving 10 days notice of his intension to do so which out assigning reasons thereof.

(18) A log book will be maintained for each lift and the record of work done for servicing, maintenance and repairs, etc. will be recorded there in jointly by the contractor and Liftman In charge to keep track of periodical work done in each lift. This will be considered basic record for all purpose.

(19) All Legal Liability in case of passenger trap in the elevator, insurance, fire shall be covered in the all-in-service contract and hence no subsequent claim in this regard shall be entertained.

(20) Agency have good track record for lift AMC work. If Agency fails to maintain complained within 10 days of time period will be take action and terminated process taken for work.

(21) Failure in lift equipments / parts due to variation in power supply will be in scope of lift agency. Lift agency will have to install necessary protective devices

like Voltage Controlled Stabilizer of necessary KVA for their all equipment like Drive, Controller etc for the same. It in scope of AMC work

- (22) Lift Agency have to provide necessary rating of DP Elcb & FP Elcb required for lift which rating suggested by CEICED Department. No extra payment made for this requirement.
- (23) The rates in the Estimate are including GST & other Taxes Which Government apply in present & future years.
- (24) Earthing provided at time of lift erection will be regularly maintained & monitored by lift agency.

Signature of contactor

Deputy Executive Engineer
Nadiad R & B Electrical Sub Division
Nadiad

MAINTENANCE OF LIFT

The inspection and tests of the lifts should be performed by a qualified Engineer. Who should be thoroughly acquainted with the mechanical and electrical details of the lifts. Inspection of lifts should be carried out such month during which time necessary oiling should be done and adjustments are made as per requirement. Agency should inform the authorised person of this department the condition of the lifts every month and thus given an opportunity of removing the defects before damage is done to the equipment or accidents occur to the passengers.

INSPECTION

(1) Switches and Fuses

Check the size of the motor fuses and the setting of any circuit - breaker should be checked against the nameplate rating of the motor.

(2) Motors

In Permanent Magnet Synchronous motor with High Starting torque of proper rating with high efficiency shall be used. motors if plain bearings with ring lubricator are fitted, it should be noted whether the oil is at the correct level and whether any leakage is occurring at the drain plug, tap, or oil gauge. Ball or roller bearings are packed with grease by the makers, and replacement is only necessary about every six months, where a little pure petroleum jelly should be used. Excessive wear of the bearings can often be detected by a distinct knock, and results in un-due strain being placed on the coupling and the worm gear bearings.

(3) Brake

The brake and the coupling upon which the brake are usually operated. The coupling should be examined to ensure that the bolts are tight and that the keys joining the shafts on each side are not loose. If the motor winding wheel is inserted, and turned in each direction, looseness of the key on the motor shaft can be detected. Similarly, the key on the worm shaft may be observed, but in this case the brake must be released. Particular attention should be given to the adjustment of the brake, as an incorrectly adjusted brake will cause faintly floor leveling. When the design permits, each half should be adjusted independently so that the clearance of both shoes are the same. The clearance between the brake lining should be as small as possible, and will be found in practice to be between 1/100" (0.25 mm & 0.4 mm), if correctly adjusted. Next adjust the solenoid plunger so that the maximum possible pull is obtained. This is the case when the maximum number of lines of force is present in the air gap. Under these, conditions the brake should just operate when the magnetic circuit closes. The spring pressure should then be adjusted until smooth and rapid stopping is obtained the actual stopping distance will vary with the car speed. After the brake has set, the car travel should not exceed about 4" (100 mm) for each 100 ft/min. (0.5 m/s) of running speed. The operation of any emergency brake gear, should also be examined

(4) Sheaves and Pulleys

The sheave or drum and any diverting pulleys should be examined to detect whether any looseness on the shafts is present due to keys working loose. If looseness is present, the key should be driven in tightly, but it may be necessary to fit a new key. With a traction drive, the sheave grooves should be examined for wear and if ridges are present in the grooves these may, in time cause rope slip which will result in rope wear. The sheave seat to the same depth in the grooves. The presence of a crack in the sheave, drum or diverting pulleys may be detected by hammer testing. Test the bearing bolts for tightness.

(5) Controller

It is technologically advanced system. The operational card file contains a logic board with microprocessor chip/PLC, random access memory (RAM) and erasable programmable read only memory (EPROM) chips to monitor and take over the command of the elevator. Advanced control system dual 64 bit embedded microprocessor with CANBUS Serial Communication mode including Regenerative power efficient operation, on site programming facility, Anti nuisance, Pte-opening, BMS/RMS with necessary online real time monitoring system having necessary connectivity for remote monitoring & other suitable supporting hardware & software devices to fulfil the purpose.

The Motion controlled consist of high performance, fully digital control ACVVV drive, vector control drive with encoder feedback closed loop system shall be used for lift car and door operation which shall be full collective selective operation hall call demand response, UP/DOWN hall stops, Main, Up/ Down Contactor with overload and phase reversal relay and safety controls. Motor over current protection, Fast speed / Deceleration, protection, Passenger over load warning device which the directly control the torque and speed of the elevator motor and thus provides constant speed control under all loads conditions.

The system continuously monitors critical aspect of system health. Self-health diagnostic capabilities are built in to the control system to speed up trouble shutting and can be monitored from seven segments display provided in the logic board. This facilitates quick identification of fault and restoration to normal operation.

Floor Selector

After the brake has been correctly adjusted, an inspection may be made of the floor selector gear if the lift is automatically controlled, and any necessary adjustments made. The operation of each striker arm and its associated switch should be examined to see whether the best possible leveling is obtained at each floor. This adjustment will provide the best average leveling in the up direction for all loads if the counterweight is equal to the weight of the car plus 50% full load. Hence, with 50% full load, accurate leveling in the up direction should be obtained. If, however, the counterweight is say equal to car plus 40% full load, it will be necessary for the car load during the load leveling test to be equal 80% full load instead of full load. This will ensure that correct traveling is obtained in the up direction with 40% full load in the car. The strikers operating the down direction switches must be adjusted in a similar manner to that for a switches, but with the car traveling in the down direction.

During these down direction tests it will be noted that the empty car will again level high and the loaded car low. When a two speed motor is employed, the floor selector will have slowing switches fitted for each direction in addition to stopping switches. The slowing switch strikers should be adjusted so that the lift speed is reduced to the low-speed value before the stopping switches are operated and the brake applied.

If stopping and leveling are performed by direction switches in the well and a cam is fitted on the car instead of a floor selector in the motor room, it will be necessary, in order to check the leveling to take measurements at the floors after stopping the lift at each, floors when traveling up empty. Adjustments should be made to the positions of the switches (except the ground floor switch) so that the stopping distances above each floor are equal. Similarly, the position of the ground floor switch should be adjusted until the stopping distance below each floor are equal when the car travels down loaded. When the switches and cam have been adjusted, the only reason for inaccurate floor leveling will be that the brake is out of adjustment. It will probably be found more convenient to test these direction switches, when fitted, after the motor room inspection has been completed.

(6) Final Terminal Stopping Switch

This should occasionally be tested by holding in the appropriate controller contactors and allowing the car to operate the switch after over traveling each terminal landing in turn. The final limit switch is usually operated by a striker on the car engaging with a stop on the limit switch operating rope, one stop being fitted for each terminal landing. The over-run after passing the terminal floor and before the limit switch operates, may be adjusted by altering the position of the rope stop. Two paint marks on the operating rope or pieces of adhesive tape are often used to indicate that when the marks are opposite to each other, the rope stops are in their correct positions in the well.

(7) Governor

The over speed governor must be lubricated where necessary and kept clean. During inspection the weights should be operated by hand to see that firstly, the control cut off switch operates, and secondly, the governor gripping jaws are released and grip the governor rope.

(8) Ropes

Before leaving the motor room a careful visual examination should be made of those portions of the lifting ropes which pass over the sheave or drum during a complete journey of the lift. Any "needling" of the ropes, i.e. broken wires, should be carefully noted, the detection of these "needles" being greatly facilitated by the aid of a small mirror used for the underside of the ropes or by a wad of cotton waste held lightly against the ropes. If performed ropes are used, much greater care will be necessary in detecting broken wires as they retain their original positions in the strands even when fractured. The presence of a few broken wires does not indicate that the rope should be immediately renewed, as the factor of safety is usually about 10, about rather that the ropes should be kept under careful observation during subsequent visit. It is very difficult to quote any rule for determining when no broken wires have been visible, and others when the rope has given long service after a comparatively large number of wires have been broken. The decision to renew a rope rests largely

upon the engineer's experience and is usually governed by the number of accident broken wires. Undue rope stretch is another indication of approaching rope failure.

(9) Call Buttons

Call the car to each landing by pressing the landing buttons in turn and if the lift is arranged for dual control and the inspector's mate rides in the car during these tests, the operation of the car cam indicator and position indicator can be observed at the same time.

(10) Landing Gates or Doors

The lock of each landing gate or door should be tested by ascertaining that it is impossible to open any gate or door by pulling or lifting, or to stop the lift by breaking the electric interlock circuit, unless the car is at that landing. It should also not be possible to move the car away from any landing with the gate or door at that landing open and if this is confirmed at each landing, then the landing door electric interlocks are breaking contact satisfactorily. If gates are fitted, it is now a convenient time to note whether they can be opened or closed readily and if not a drop of oil on each picket pin and on the overhead supporting roller pins, unless the latter are of the ball breaking type, will ensure easy operation. See that door hangers and tracks are clear and adequately lubricated.

(11) Car Floor Switch

Check that the car door or gate electric switch shall prevent the lift from being started or kept in motion unless the car gates or doors are closed.

(12) Car Door or Gate Electric Contact

If this switch closes and opens satisfactorily the car may be moved by the car buttons or car switch if the door is open. The cover of the switch should be removed occasionally and if necessary the spindles lightly oiled and the contacts cleaned. The position of this interlock may be such, however, that it may have to be inspected from the top of the car.

(13) Car Push Buttons

Test these by bringing the car to each floor in turn by pressing the appropriate button. It should be possible to stop the motion of the car at any position in the well by operating the stop-button. If any button is uncertain in its action, the cover plate should be removed and the contacts cleaned and if necessary a new spring fitted.

(14) Emergency Signal

The bell buzzer of telephone fitted in the car should be operated and should be clearly audible outside the lift well when the car midway between adjacent landings. In some building this signal is arranged to give warning in the maintenance engineer's room.

(15) Lighting Fitting

Examine to see that it is securely fastened that the illumination is adequate, and that the switch operates satisfactorily.

(16) Door Operating Gear

Examine the motor and door operating levels, clean and lubricate if necessary. Watch the operating of the gear when the doors open and close.

(17) Retiring Cam Mechanism

Operate the cam by pulling the connecting chain by hand and not if the cam advances and retires freely. Observe whether it clears the door-lock striker arm or the sill trip lever when in the retired position. The operating solenoid or motor and levers should be examined and lubricated.

(18) Governor Rope Release Carrier

Visually examine the rope grip and the springs to see that they are clean and not rusted. This release should be tested by engaging the governor jaws (usually in the machine room) with the governor rope by hand and then lowering the car either by the motor hand wheel or at the slow leveling speed. The shackle should then pull out of its carrier and the if the descent of the car is not checked the safety gear will operate.

(19) Rope Tension

If rope equalizing gear is not fitted, the rope tensions may be tested with the car about half way between the top of the well and the counterweight. Pull each rope in turn with a spring balance and note the deflections with equal pulls. If any rope can be deflected more than the others, it is not carrying its proper share of the load and adjustments should be made at its screwed support.

(20) Counterweight

When the car is opposite the counterweight, the counterweight shoes and guide lubricators may be inspected in a similar manner to that adopted for the car fittings. Examining the counterweight sections to see that none is displaced in the frame and that the nuts and pins are in their proper positions at the ends of the tie rods. If 2 to 1 roping is employed see that the pulley at the top of the counterweight is adequately lubricated. In many lifts the counterweight oil buffers are fitted to the bottom of the counterweight and if this is the case examining the oil level in them. Make sure that the counterweight guard at the mid-well position is securely fixed. Inspect the counterweight safety gear as described later for the car gear.

(21) Guides

When moving the car slowly from the top to the bottom of the well, the guide surfaces, joints, clips and brackets should be inspected for wear or looseness, and when the car is at the bottom landing may noticeable bend in the guides can be detected by sighting along the face of each car and counterweight guide in turn.

(22) Landing Gate or Door Locks

These should be examined periodically and if necessary the striker arms adjusted and worn rubbers renewed. The covers should be removed the inside of the box wiped free of dust, the mechanism lightly oiled and the contacts cleaned, with centre opening swing doors and locks are mounted on the underside of the door top frame and these may be inspected from the landing or the inside of the car.

(23) Slowing and Stopping Switches

If showing and stopping are performed by switches on the car and cams in the well or vice versa it should be noted whether the switches and cams are in proper alignment and are securely fastened. The slowing switches should operate sufficient in advance of the stopping switches to enable the motor to reach its slow leveling speed before the application of the brake. The normal terminal stopping switches are frequently fitted on the car and are operated by cams in the well and these should receive careful attention. After inspection, all these switches should be tested by operating the car at normal speed between the extremes of travel.

(24) Car Safety Gear

If of the wedge type, examine the jaws for freedom from contact with the guides and turn the drum by hand or pull the safety cable until the jaws touch the guides. Note that there is sufficient cable left on the drum so that it will not be pulled from the drum when the safety operates. See that the levers are adequately lubricated and that there is no excessive slack in the safety rope.

(25) Car and Counterweight Buffers

If there are of the special or volute spring pattern, examine to see that they fit vertically and securely in their bases and the spring are not distorted. With oil buffers ascertain that they have a sufficient supply of oil by inspection the gauge provided on each and whether there is any side play in the pistons. If the counterweight buffers as well as the car buffers are mounted in the pit, they will all be of the spring return type and may be partly depressed by standing on the top of the plunger. After release, the piston should return to its top position.

(26) Governor Rope Pulley

Inspect during operation to make sure that the pulley frame is free to slide in its guides and that the parts are adequately lubricated.

Signature of Contractor

Deputy Executive Engineer
Nadiad R & B Electrical Sub Division
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