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Questions related to installation,
maintenance, and troubleshooting of the
control valves ?



1.How to mount the actuator on the control valve?

- ❖ The actuator support must be fixed in the valve body, fix it according to our requirement and the actuator must be fixed in the support and the valve body assembly. After this fix the lift indicator to the actuator spindle.

2. What should we do if the seat is not coming out of the body?

- ❖ By using a gas flame, heat the seat and by doing so the control valve can be relieved from the stress that is caused by different operating parameters.



3. If the positioner is out of calibration what should we do?

- ❖ Check the bearings and if damaged replace it with new, check the zero adjustment screw, and if it is loose, then tight it. We must make sure that the cam is rolling properly on the roller. Check the piston-cylinder assembly remove the screw and springs so that we can lift the diaphragm chamber and the piston can be seen clean the dust in the piston and if there are scratches in the piston then replace both the piston and the cylinder.



4. How could we determine the positioner diaphragm assembly leakage?

- ❖ At first, open the position cover and connect the signal from the input then pour or spray a little bit of fluid in the diaphragm assembly. If there is any leakage from O-rings then it must be replaced or if there is any damage in the diaphragm then it must be replaced.

5. What is fail closed in a control valve?

- ❖ It is the condition in which the valve closure member moves to a closed position during the failure of the actuator energy source.



6. What is fail open in a control valve?

It is the condition in which the closure member of the valve moves to an open position during the failure of the actuator energy source.

7. What is fail-safe in a control valve?

It is the process in which the valve and its actuator will make the closure member of the valve fully close or open, or be in its position during the loss of the actuating energy supply. The position will be selected according to the safety of the process.



8. Explain the flow characteristics of a valve?

It is the relationship between valve characteristics and valve travel.

9. How to check the valve position?

We must check the position of the valve by checking the indicator on the valve. Also, do the operational checks such as the temperature and pressure levels and also the direction of the flow.



10. What are the major problems in a control valve?

Gland and bonnet leakage, installation of the valve could be incorrect, free movement of the wheel/valve spindle

11. How valve passing could occur and how to solve this problem?

It could happen because of cut-marks or scratches on the seat ring or disc plug, improper tightening of the valve could also be a reason for this. This problem can be solved by polishing of seat and disc/plug and also by resetting strokes`



12. When is a control valve hard to operate?

- ❖ It could be because of the bending of the stem or the spindle
- ❖ Damage of the stem bearing
- ❖ It could be because of the rusty stem or nut
- ❖ It could be because of the jamming of the disc on the seat by over-travel
- ❖ Oversize gland packing could also be a reason for this

13. What could be the cause of gland leakage?

- ❖ It could be because of the wrong fitting of the gland packing or it could be because of the loose gland or due to damaged gland packing.



14. How to determine the incorrect installation of the valve?

The control valves are only suited for unidirectional flow so we must check the direction before the installation and the control valve should be installed vertically in a horizontal pipeline

15. What could be the cause of bonnet leakage?

It could be because of the damaged gasket or because of the scratches on the bonnet. A loose bonnet will also cause leakage.



16. What could be the cause of the free movement of the wheel/valve spindle?

- ❖ It can cause when the wheel locking gets free
- ❖ Broken spindle
- ❖ Damage to the stem nut thread, or it can cause if the holder of the plug or disc unlocked with the spindle

17. What is lapping?

- ❖ Lapping is also called polishing it is the process in which removal of the material takes place so that we could get a smooth plane surface and lapping paste is used to do this process.



18. What are types of lapping paste?

- ❖ Diamond paste, tungsten carbide paste, silicon carbide paste

19. Describe the operating procedure of the valve and how to operate it without any damage to the valve?

- ❖ At first, we must open and close the valve slowly, then clean the valve spindle if it is dirty. After this, the valve should be closed a little to make sure that the wheel is free. We must open the bypass valve first if it is provided with the main valve. We should not close the valve when it is passing and don't try to close it by excessive load, so in this case, we must reopen the valve and close it again. Over-travel of the isolation valve must be avoided and the gate valve should not be kept partially open



20. What are the operator types used in butterfly valves in power plants?

- ❖ Mostly three operator types are used on the butterfly valve and they are manual gear reducer, electric motor, and hydraulic cylinder

21. How to handle the noise

We can handle the noise by controlling the velocity, so during the pressure drop cases, we must keep the velocity low



22. How to select a control valve so that it would be suitable to do the required application without any fault?

- ❖ It should be selected according to the media that it handles like gas, slurry, or solid.
- ❖ We must also cons* We must also consider the corrosiveness of the media
- ❖ We must also consider the atmospheric corrosiveness
- ❖ It must be selected according to the flow, like velocity, capacity, and direction
- ❖ Pipe size and media temperature must be considered too
- ❖ It must be selected according to the maximum and minimum operating pressure
- ❖ It must be selected according to the operation like if it is automatic or manual



23. What should we do if the valve is leaking past the ball?

- ❖ We must install a repair kit or adjust the limit switches of the actuator

24. What should we do if the valve stem leaks?

- ❖ This is because of the worn/damaged stem, so if it is a plastic valve then install a repair kit. We should replace the valve stem or replace the valve

25. What should we do if the valve body leaks?

- ❖ It could be because of the loose bolts on the body or because of the operating pressure or the body seals are defective. So in this case check the bolts and the operating pressure or install a repair kit/ replace the valve.



26. What should we do if the operating torque of the valve is excessive?

- ❖ It could be because of the swollen seals or because the valve is buildup with particulate, or it could happen if the bolt or stem nut is tight or because of the damaged stem seal. So this can be solved by installing a repair-kit or by cleaning the valve, check if the bolts and stem nuts are over-tight if so loosen it.

27. What should we do if the rotary valve is not rotating?

- ❖ We should readjust the actuator stops, replace the shaft, or replace damaged parts. We must replace or clean the parts or recheck the actuator sizing and valve service limit.



28. What are the types of noises in a control valve?

- ❖ There are three types of noises in a control valve they are mechanical-vibration noise, cavitation noise, and aerodynamic noise

29. What is the major reason for the noise in a control valve?

- ❖ It is because of the fluid velocity

30. Explain aerodynamic noise in the control valve?

- ❖ Aerodynamic noise is caused by the interaction of the turbulent fluid with the laminar fluid in the mixing region or it could be caused by the velocity of the fluid.

31. What is the cavitation noise in a control valve?

- ❖ The cavitation noise is created in a control valve by the liquid flow through the valve and piping



32. What are the major tools for lapping/polishing?

- ❖ The major lapping tools are glass or specially designed C.I tools

33. What is cavitation?

- ❖ The cavitation takes place in 2 stages in the first stage the voids or cavitation will be created and in the second stage the voids will explode back into the liquid and this could damage the trim.

34. How to inspect trim material?

- ❖ Check the trim materials such as seat ring, plug, gasket, and check for body and bonnet erosions.

35. How to check leakage in a control valve?

- ❖ We must check between the seat and the plug, then cage and plug, packing material, bonnet, and flanges.



36. How to check if the valve is passing?

- ❖ Check the body temperature of the valve, the valve opening could be reduced to fifty to thirty percent in case of a valve passing, and check for abnormal sounds.

37. How to choose the material for the trim?

- ❖ It must be selected according to the type of process fluid, pressure, and temperature. We should also consider the function of the trim like throttling, shutoff class.

38. Explain flow characteristics?

- ❖ This can be explained as the relation between the valve travel and flow coefficient when the valve travels from zero to a hundred percent open.



39. Why characterizing is needed?

- ❖ It is required to get control loop stability for the required operating conditions

40. Explain throttling?

- ❖ It is the process of controlling the fluid flow through a valve by using the orifice opening

41. What are the major types of damages that can be seen in a control valve?

- ❖ Cavitation, erosion, flashing, fretting, and chemical corrosion

42. How to handle abrasive materials?

- ❖ We can handle abrasive materials by reducing the velocity, while reducing the velocity we must make sure that the particles must not drop out of suspension.



43. What should we consider if we use a transducer in a control loop?

- ❖ If we use a transducer in a control valve then we need to specify a positioner on the control valve, if we fail to do so then the transducer will take away the available thrust of the actuator and there could be a valve leak too.

44. What are the factors that must be considered if we use bellow seal in a control valve?

- ❖ We must size the valve when we use a bellow seal in it, so we can make the valve's throttling position close to the bellows rest position and this will decrease the wear on the bellows.



45. What should we do if a control valve fails to respond while starting up?

- ❖ Sometimes a control valve would fail to respond or remains in a fully open or fully closed state and in that case, we should check the controller and reverse the controller action.

46. What should we do if a PLC is used to control the valves in a system?

- ❖ If a PLC is used then we should specify the valves that have linear flow characteristics

47. What could be the cause of external leakage?

- ❖ External leakage can be caused by the failure of a gasket or packing



48. How should we repair the control valve seat?

- ❖ It must be done by drilling the valve body and by injecting the sealant into the seat.

49. How to repair the bonnet gasket?

- ❖ In order to do this, we must fit a clamp around the joint and the sealant should be injected through the clamp,

50. What could be the cause of sliding wear?

- ❖ It could be because of the misalignment or due to the incorrect chosen material.



51. What should we do if the valve travel is jumpy?

- ❖ This could happen if the positioner gain is too high, so in that case, adjust the positioner gain and replace it with a lower gain model. In case if the positioner is damaged then replace it, it could also be rectified by adjusting the booster bypass.

52. When do we need hardened trim for the control valve?

- ❖ We must use hardened trim for a control valve if we are dealing with abrasive or erosive fluids.



Thanks ...

