

Federal Wage System Job Grading Standards for Air Conditioning Equipment Operating, 5415

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WORK COVERED

This standard covers nonsupervisory work concerned primarily with operating air-conditioning systems for large buildings or complexes of buildings. Also included are jobs that involve the operation and regulation of cold storage and specialized climate simulation facilities. The work requires the ability to adjust equipment to maintain desired temperatures and humidity, start, operate, and stop the air handling equipment and centrifugal compressors or absorbers, and detect and diagnose malfunctions in equipment. Operators must know the purposes and locations of all equipment in the systems and the auxiliary equipment such as cooling towers, water pumps, air compressors, liquid circulating pumps, and fans.

WORK NOT COVERED

The standard does not cover work that primarily involves:

- Installing, repairing, and modifying a variety of equipment and systems that achieve regulated climatic conditions. (See [Job Grading Standard for Air Conditioning Equipment Mechanic, 5306.](#))
- Operating one or more types of utilities, such as wastewater treatment, steam generation, or water treatment, in addition to the cooling systems and cold storage facilities on a continuing basis when the knowledge and skill requirement for anyone area is not paramount for recruitment, reduction in force, or other personnel processes. (See [Job Grading Standard for Utility Systems Operating, 5406.](#))

TITLES

Jobs graded by this standard are titled *Air Conditioning Equipment Operator*.

GRADE LEVELS

This standard does not describe all possible grade levels for this occupation. If jobs differ substantially from the skill, knowledge, and other work requirements described in the grade levels of the standard, they may be graded either above or below these grades based upon the application of sound job grading principles.

HELPER AND INTERMEDIATE JOBS

Helper jobs are graded by the Office of Personnel Management [Job Grading Standard for Trades Helper Jobs](#).

Work evaluated at grade 9 and above in this standard is to be used as the Journey level in applying the grading table in the Office of Personnel Management [Job Grading Standard for Intermediate Jobs](#).

SPECIAL ADDITIONAL RESPONSIBILITIES

This section provides guidance for determining the grade level of certain plant operating situations. The Air Conditioning Equipment Operator Standard describes normal operation.

However, employees in certain situations work under special circumstances. When positions clearly meet the criteria described below, one additional grade may be credited to plant operator positions at the full performance level whether they work alone or with a small group of plant operating employees. It is the intent of this provision that only one operator on each shift be credited with an additional grade for shift-level responsibility.

Additional grade credit will be added only to plant operators at the full performance level who are assigned shift responsibility on a regular and recurring basis. Credit will not be given to plant operators who regularly work when a shift supervisor is present or at a nearby facility.

Most air conditioning systems run on a 7-day, 3-shift plan. Operators may be assigned to a specific shift or alternate working on all three shifts, including weekends. On second and third shifts and on weekends, one operator is typically designated as the "operator in charge" of the complete plant, including ancillary and stand-alone air conditioning systems which may be geographically dispersed, and he or she is responsible for following instructions which are typically supplied in writing from a supervisor or by the "operator in charge" on the previous shift. The "operator in charge" typically performs additional duties which are more responsible and require a slightly higher level of skill and knowledge than full performance level operators who are on duty where a supervisor is available to provide specific guidance and assistance.

The "operator in charge" must have a thorough knowledge of the entire air conditioning system and user requirements in order to locate problems and initiate immediate corrective action to maintain adequate temperatures and humidity. He or she, in the absence of written contingency procedures, must have the responsibility to decide whether to shut down an air conditioning system and, if so, whether equipment still in operation can handle the load or whether to attempt to bypass the trouble until corrective action has been completed. Typically, the "operator in charge" has responsibility to determine what work must be done and has the authority to approve overtime or to call in necessary maintenance personnel. The operator is responsible for relaying instructions to the next shift operator including problems encountered and action taken.

While these and other similar situations do not describe supervisory responsibilities, they represent situations which indicate that individuals designated as "operator in charge" have more responsibility and a higher level of skill and knowledge than operators who have a supervisor who is available for technical advice and guidance.

AIR CONDITIONING EQUIPMENT OPERATOR, GRADE 9

General: Grade 9 level air conditioning equipment operators run a centralized, multiple zone air conditioning plant that serves a building or complex of buildings. The air conditioning plant consists of multiple large capacity chillers (compressors) or absorbers that perform various functions such as heating, humidification, dehumidification, and filtration, in addition to cooling. The operators can control the separate zones from a master control panel, i.e., select the operating temperatures, minimum fresh air, start and stop fans, and check zone temperatures, or they may perform the same functions from local switches and gauges at the equipment site. Operators know when to take compressors or absorbers, pumps, air handlers, and cooling tower fans off line, or to place additional ones on line to meet load requirements, and to log readings for the various zones and chillers or absorbers that are in operation. Among other duties, operators at this grade level:

- Check temperature sensing points in various building areas and adjust controls to meet local requirements and desires.
- Start, regulate, and stop the various items of air handling equipment from central switches or from decentralized switches in fan or equipment rooms. The operators start, stop and regulate the air conditioning compressors or absorbers, the cooling tower fans, and other related support equipment in accordance with procedures with central or local switches as required for load conditions. They also adjust valves and reset temperature controls and steam spray valves for humidity control as conditions warrant, based on observations.
- On a continuing basis, log results of water condition tests, dry and wet bulb temperatures, chiller oil level and oil pressure, water temperature entering and leaving condensers, volt and ampere readings, vacuum pressure, refrigerant temperature and level, high and low pressure readings, humidity, and other readings.
- Compute tonnage and make-up water used per hour and the gallons being circulated per unit of time as well as the heat load.
- Test water in cooling towers and add chemicals for control of alkalinity, algae, and scale formation.
- Perform operator maintenance such as adding refrigerant, changing filters in air handlers, cleaning strainers, replacing broken or worn drive belts on motors, lubricating the various compressors, fans, shafts and steam glands of pumps, and moving parts of other operating and standby equipment. Use various lubricants and maintain a log of lubricant changes and requirements.

- Perform repairs such as replacing valve plates, broken flares, and copper tubing, repacking glands, adjusting expansion valves, replacing small electric motors, and making temporary repairs to pipes.
- Assist mechanics in major overhaul or maintenance of equipment during equipment breakdown, or in the noncooling season.
- May also monitor and regulate the operation of refrigeration equipment for items such as cold storage, or icemaking.

Skill and Knowledge: Grade 9 level air conditioning equipment operators know the function, purpose, and location of all equipment in the system operated. Typical examples of equipment are absorbers or centrifugal compressors, starters, circuit breakers, condensers, evaporators, heat exchangers, chilled water and condenser water pumps, filters, fans, controls, motors, thermostats, humidifiers, cooling towers, heating and cooling coils, recorders, and alarms. They know the principles of the functioning of refrigeration and air conditioning equipment and component systems as well as the principles underlying the electrical or steam feeder distribution system to the chiller plant.

Operators at this level know how to operate and perform minor repairs on the air conditioning equipment with a minimum of guidance from the supervisor. They have skill in the use of measuring instruments and testing equipment such as flowmeters, recording meters, micrometers, psychrometers, velometers, and electronic leak detectors. Operators at this level have skill in controlling plant operations from the control center without causing damage to plant equipment. They also have skill in the use of various hand and power tools including those associated with pipefitting.

Grade 9 level operators detect malfunctions on equipment and locate and diagnose operational problems to determine the probable cause of trouble and make necessary adjustments or minor repairs. They read and interpret blueprints, diagrams, schematic drawings, water flow charts, and specifications regarding servicing and operation of the refrigeration and air conditioning equipment.

Responsibility: Grade 9 air conditioning equipment operators receive work assignments from a supervisor or a higher grade operator. The supervisor occasionally spot checks work for adherence to operating techniques and established practices and directives. Operators at this level maintain continuous observation of all operating equipment to recognize dangerous operating conditions. They utilize drawings and circuit diagrams of the plant and auxiliary equipment to locate defects in equipment. When unusual problems occur, the supervisor provides technical advice and assistance.

Physical Effort: Prolonged physical effort is not routine. Operators at grade 9 occasionally lift objects weighing up to 23 kilograms (50 pounds). Lifting equipment, such as chain hoists, is available to move heavier objects. Some standing, stooping, bending, and work on ladders (occasionally over operating equipment) is required.

Working Conditions: The work is usually performed indoors with adequate light and ventilation. Operators at grade 9 occasionally work in areas of temperature extremes in the plant or are exposed to changes in temperature while working on outside cooling towers, roof exhausts, and ventilating fans. Noise level is often high, sometimes to the point of requiring ear plugs. Other protective devices such as goggles, masks, and gloves, may be needed periodically. They are exposed to the possibility of burns when working on steam and hot water lines. Operators are also subject to noxious gases, cuts, bruises, and scrapes.

AIR CONDITIONING EQUIPMENT OPERATOR, GRADE 10

General: Grade 10 air conditioning equipment operators operate a centralized, multiple zone system similar to the grade 9 level, and also check temperature sensing points in the buildings, adjust controls, start, regulate, stop air handling equipment, and reset temperature controls and steam spray valves for humidity control. They log gauge readings, test water in cooling towers and record results of water condition tests, perform operator maintenance, and replace minor parts. In contrast with the grade 9 level, equipment at the grade 10 level is more complicated and difficult to operate because of the unusual equipment configuration requirements and exceptional size of the building(s) serviced and the various needs of the users. Systems at this level have extremely large capacity and flexibility and are typically located at facilities such as major industrial installations with many large shops, laboratories, offices, support, and other buildings. The level of complexity involved in this kind of situation is also reflected in the large number of components and amount of auxiliary equipment to coordinate and the large number of controls and gauges to monitor and use as bases for judgments and decisions.

Typical of this more complex level of work are plants that use steam driven centrifugal compressors, or a combination of steam driven absorbers and steam driven compressors, thus requiring the operators to regulate pressure reducing valves that feed steam to absorbers. A wide variety of specialized work activities that generate diverse air conditioning requirements are carried out in the building(s) and are served from the central system, creating added difficulty. Some of the diverse areas served from this central system (e.g., industrial, computer and telecommunications areas, hospital operating rooms, special research laboratories that contain sensitive measuring equipment, clinical laboratories, or intensive care wards) require such precise control of temperature and humidity that temperatures cannot vary by more than plus or minus one degree; permissible humidity variation is similarly strict.

Skill and Knowledge: Air conditioning equipment operators at this grade level have a thorough knowledge of the functions and procedures necessary to run a centralized, multiple zone air conditioning system that contains more components, controls, gauges, and auxiliary equipment than the standard type, and the capacity of chillers or absorbers substantially exceeds the conventional. The operators know the operating principles of a variety of steam, gas, diesel, and electrically driven compressors and absorbers, including steam driven centrifugal compressors and the safety considerations involved in use of steam.

They can troubleshoot the more unusual malfunctions in advanced equipment and systems by using numerous testing techniques and items of test equipment; they can quickly and expertly pinpoint sources of trouble, whether in the controls or equipment itself and determine the nature and extent of repairs or adjustments needed.

Responsibility: Grade 10 level air conditioning equipment operators receive work assignments from a supervisor or a higher grade operator. Supervisory review is normally made only in emergency situations or of actions taken to resolve unique malfunctions. The unusual complexity of the system, combined with the variety of air conditioning requirements and greater amount of auxiliary equipment, require constant attention by the operator and a higher degree of responsibility at this grade level than at the next lower grade level. Greater judgment and independent action is required on such matters as how to make interim repairs, when to shut down or activate equipment, and how to balance the more complicated systems found at this level.

Physical Effort: Same as [grade 9 level](#).

Working Conditions: Same as [grade 9 level](#).