

# STATE OF MONTANA

## JOB DESCRIPTION

*Montana state government is an equal opportunity employer. The State shall, upon request, provide reasonable accommodations to otherwise qualified individuals with disabilities.*

**Job Title:** Materials Lab Technician      **Location:** Helena HQ

**Position Number:** 40014; 40018; 40022; 40052; 40070; 40106; 40109

**Department:** Transportation

**Division and Bureau:** Highways & Engineering Division/Materials Bureau

**Section and Unit:** Physical Testing Section/Testing Operations Unit

### **Job Overview:**

This position is responsible for laboratory testing of a variety of materials used in highway and bridge construction and maintenance in order to ensure compliance with project specifications and State and Federal regulations. The test results also provide information to design staff, contractors, and project managers on the development and application of materials. Technical testing procedures vary based on the specific section e.g. Bituminous Mix Design or Asphalt Properties. The position reports to the Lab Supervisor in the assigned section.

### **Essential Functions (Major Duties or Responsibilities):**

#### Materials Testing

75%

Perform various tests to ensure material complies with established standards, project specifications; and independent assurance and final record requirements. This work involves the application of materials testing methods; the ability to perform mathematical computations and interpret results; knowledge of properties and characteristics of a variety of materials; materials inspection testing procedures; and Federal and State standards and methods. This work also requires skill in operating a variety of testing equipment, adapting test methods and techniques, and operating office equipment for calculations and record keeping. The Duties of this position are primarily performed in one of the areas of the Testing Section. These areas include Bituminous Mix Design, Asphalt Binder Properties,

Concrete Mix Design, Aggregate Testing, Geo-Textile Testing, pre-cast Concrete Inspection, Nuclear Densometer Gauge Testing, etc. This position is expected to be capable of performing in all of these areas. Specific tasks include:

- Gyrotory testing of cylindrical specimens of bituminous paving mix to determine asphalt content; percent air voids; and other volumetric mixture properties including voids in mineral aggregate, voids filled with asphalt, dust asphalt ratio, and dust proportion. This involves ensuring proper mixing and temperature of the sample; determining the maximum specific gravity (Rice Gravity) before compaction; and measuring the final specimen for bulk specific gravity. Then using the bulk specific gravity and other known values, the volumetric mix properties are calculated. The position must exercise judgment in applying established test procedures; watch for deviations from established standards and project specific mix designs; and evaluate the results of the various tests to ensure they correlate.
- Analyzing and interpreting data for discrepancies and providing recommendations on mix design alterations. This involves correlating Gyrotory test results with other tests, such as the Hamburg, to determine relationships between factors such as additives, gradations, asphalt content, etc. The Helena lab verifies contractor submitted mix designs based on these test results. This position will report non-typical sample data to the supervisor along with recommendations as to the cause of the results.
- Verifying properties of Performance Graded Asphalt Binders and Asphalt Emulsions. This involves running tests using highly specialized equipment, such as the Dynamic Shear Rheometer and the Rolling Thin Film oven, to ensure that the Asphaltic Materials meet specifications. If a material fails to meet specifications the Technician must inform supervisor then determine what further testing is necessary to discover the extent of the failure.
- Performing sieve analysis on coarse and fine aggregates to provide information on particle size distribution. This involves preparing the sieving apparatus (Gilson shaker) by nesting sieves in the correct order and loading material after determining the proper amount based on aggregate size and sieve capacity. After shaking, the material on each sieve is weighed and particle distribution calculations are completed.
- Performing R-value, Micro Deval, and Sodium Sulfate testing on a variety of soils and aggregates for special borrow source approval, pit approval, and soils surveys. This involves properly preparing multiple specimens, running applicable test procedures, analyzing and reporting results, and comparing them to project specifications.
- Conducting inspections of seed and fertilizer that will be used for construction projects to determine compliance with project specifications and State seed law and fertilizer use regulations. This requires knowledge of MDT sampling and testing methods and the properties, characteristics, and related concepts of seed and fertilizer such as purity and germination. It also requires the ability to perform extrapolative calculations in order to convert content and purity results into large quantity blends.

- Conducting inspections of pre-fabricated and pre-cast concrete construction materials such as culverts, manholes, and designed elbows. These inspections involve traveling to fabrication plants, sampling materials, and observing fabrication processes. They also require knowledge of the properties and characteristics of a variety of materials; State and Federal standards; and manufacturing processes in addition to the ability to comprehend engineering designs, plans, and specifications.
- With the appropriate certification, perform compressive strength testing of various cementitious materials such as concrete, shotcrete, cement treated base, cement grout, and CLSM. This involves operating complex equipment, taking precise measurements, and performing mathematical calculations to determine the materials strength.
- Performing other miscellaneous tests on items such as pavement markings, soils, fencing materials, crack sealer, and geo-textiles.
- Performing bridge deck inspection activities through the use of various equipment such as core drills, GPR, chain drag, etc.

Test Procedures and Processes

15%

Assist in the development and refinement of new test procedures and processes. This involves practical application of new testing methods and equipment, providing recommendations on feasibility of new applications, and assisting in documenting test procedures. This work requires knowledge of the principles of materials testing; industry standards and processes; and standardized testing procedures and protocols.

Maintenance of Laboratory Equipment

5%

Maintain and repair laboratory testing equipment to ensure safety, accuracy and proper operation, as well as contain costs and extend life. This involves a variety of processes including routine maintenance; checking tolerances; replacing worn or damaged parts; and assessing the overall condition of equipment and the need for repair or replacement.

Supply Inventory

5%

Assists the supervisor in ordering supplies and equipment. This involves monitoring supply levels, preparing order forms, and projecting needs based on work load.

This position is covered by the Materials Lab Advancement Policy; therefore, assigned duties, responsibilities, and related pay band/classification levels will be in accordance with an individual's qualifications, education, training, and work experience and Advancement Policy status.

## **Supervision**

The number of employees supervised is: 0

The position number for each supervised employee is: N/A

## **Physical and Environmental Demands:**

### Physical:

- Ability to lift 35 pounds repeatedly (concrete cylinders, sample bags, Marshall hammers, etc.)
- Manipulation of testing equipment (Gilson shakers, compaction devices, etc.)
- Bending, lifting, remaining standing or walking (within the lab) for extended periods
- Work with high temperatures (350° F) material and equipment (ovens, molds, liquid asphalt, etc.)
- Work with caustic chemicals and solvents (lime, acids, liquid mercury, etc.)
- Exposure to dust and noise
- Operate electronic equipment (computers, calculators, etc.)

### Mental

- Attention to safety practices and procedures at all times
- Demand for accuracy and precision at all times
- Ability to multi-task
- Ability to perform mathematical calculations
- Ability to meet inflexible deadlines
- Compiling, comparing, and analyzing data

## **Knowledge, Skills and Abilities (Behaviors):**

### Knowledge:

The position requires knowledge of materials inspection and testing procedures; the properties and characteristics of a variety of materials; laboratory testing protocols and procedures; highway construction methods and techniques; and safety practices and techniques.

### Skills:

The position requires skill in operating a variety of testing equipment; both mechanical and electrical; and analog and digital. It also requires skill in performing mathematical calculations, using computer software, interpreting results, accuracy, precision, attention to detail, promptness, schedule keeping, flexibility, adaptability, and comprehending plans and specifications.

**Minimum Qualifications (Education and Experience):**

Band 3

The required knowledge and skills are typically acquired through a combination of education and experience equivalent to a high school diploma or equivalent and one year of materials inspection technician related work experience.

Band 4, Level I

The required knowledge and skills are typically acquired through a combination of education and experience equivalent to a high school diploma or equivalent and three years of materials inspection technician related work experience or qualification based upon Helena Materials Lab Advancement Policies.

Band 4, Level II

The required knowledge and skills are typically acquired through a combination of education and experience equivalent to a high school diploma or equivalent and four years of materials inspection technician related work experience or qualification based upon Helena Materials Lab Advancement Policies.

Alternative qualifications include: Additional education (AA, BS, etc.), training, or work experience directly related to this type of work and congruent with course-work training outlined in the Materials Lab Advancement policies may be considered toward meeting the specified qualifications for this position.

**Special Requirements:**

*List any other special required information for this position*

- |  |   |
|--|---|
| <input type="checkbox"/> Fingerprint check | <input type="checkbox"/> Valid driver’s license |
| <input type="checkbox"/> Background check  | <input type="checkbox"/> Other; Describe        |
| Union Code                                 | Safety Responsibilities                         |

The specific statements shown in each section of this description are not intended to be all inclusive. They represent typical elements and criteria considered necessary to perform the job successfully.

**Signatures**

My signature below indicates the statements in the job description are accurate and complete.

---

|                             |              |             |
|-----------------------------|--------------|-------------|
| <b>Immediate Supervisor</b> | <b>Title</b> | <b>Date</b> |
|-----------------------------|--------------|-------------|

---

|                              |              |             |
|------------------------------|--------------|-------------|
| <b>Administrative Review</b> | <b>Title</b> | <b>Date</b> |
|------------------------------|--------------|-------------|

My signature below indicates that I have read this job description.

---

|                 |              |             |
|-----------------|--------------|-------------|
| <b>Employee</b> | <b>Title</b> | <b>Date</b> |
|-----------------|--------------|-------------|

**Human Resources Review**

**Job Code Title: Materials Inspection Tech      Job Code Number: 519614**

**Pay Band: 4**

My signature below indicates that Human Resources has reviewed this job description for completeness and has made the following determinations:

- |   |  |
|---|--|
| <input type="checkbox"/> FLSA Exempt                        | <input checked="" type="checkbox"/> FLSA Non-Exempt        |
| <input type="checkbox"/> Telework Available                 | <input checked="" type="checkbox"/> Telework Not Available |
| <input checked="" type="checkbox"/> Classification Complete | <input type="checkbox"/> Organizational Chart attached     |

**Human Resources:**

Rena Lang                                      Workforce Planning Manager                                      10/26/2018

---

**Signature                                      Title                                      Date**