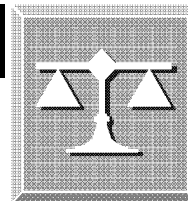


TS-4 April 1971

General Schedule  
Position Classification Standards



WCPS-1 August  
2001

POSITION CLASSIFICATION  
STANDARD  
FOR  
HYDROLOGIC TECHNICIAN  
SERIES,  
GS-1316



Workforce Compensation  
and Performance Service



**NOTE**

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If you find page references near the right hand margin of this standard they indicate the pagination of the official, printed version of this standard. For example, a notation "Page 2, 4/88, TS-87" would mean that (1) page two of the printed version begins here, (2) the date of issuance was 4/88, and (3) the Transmittal Sheet number was TS-87.

# Hydrologic Technician Series

## GS-1316

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## SERIES DEFINITION

This occupation includes positions of hydrologic aids and technicians who apply practical knowledge of hydrologic methods and techniques; and of the construction, application, operation, and limitations of instruments, equipment, and materials used in hydrologic investigations. They collect, select, compute, adjust, and process data; prepare charts and reports; and perform related duties supporting professional work in hydrology, the science concerned with the study of water, its quantity, quality, availability, movement, and distribution.

This occupation involves technical work in support of the efforts of professional hydrologists and other scientists and engineers working in areas of hydrology.

## EXCLUSIONS

1. Positions requiring primarily professional knowledges of hydrology are classified in the [Hydrology Series, GS-1315](#).
2. Nonprofessional technical occupations which primarily require a practical knowledge of the methods and techniques related to one or more areas of engineering, for example, the design or construction of water control structures; or natural science, for example, chemistry or meteorology, where knowledges and skills in practical hydrology are not paramount. Such positions are classified in the [Engineering Technician Series, GS-802](#); the [Physical Science Technician Series, GS-1311](#); [Meteorological Technician Series, GS-1341](#); [Forestry Technician Series, GS-462](#); or other series as appropriate.

## BACKGROUND INFORMATION

Hydrologic technicians presently work in four areas concerned with:

1. Gathering basic hydrologic data concerning the quantity, quality, availability, movement, and distribution of water;
2. Developing climatological and hydrologic data for current or proposed engineering projects;
3. Computing and processing data to be used in forecasting river stages or calculating sediment loads or volume of pollutants;
4. Calculating water surface profiles resulting from routing hypothetical floods through controlled river systems and reservoirs.



The hydrologic technicians' functions of gathering and processing hydrologic data are closely related. To gather or process data independently, the technicians must have a thorough knowledge of the techniques and procedures applied both in the field and in the office, if consistent results are to be obtained.

Hydrologic technicians who collect data in the field need to understand data processing and the limitations of the sampling methods in order to differentiate between good data and inadequate or useless data. These field technicians need to observe and record conditions and circumstances which may affect the data, and to follow established inspection and maintenance procedures. While in the field, if measurements deviate appreciably from established trends a check measurement may be necessary. Thus, rough computations must be made to check the particular data being obtained. When deviations are found, some experience is necessary to determine the cause of the deviations.

Depending on conditions, it may be necessary for technicians to exercise ingenuity and initiative in order to obtain valid data, for example, to clear away or add rocks and debris to a section of a stream in order to narrow the channel and to increase the depth of flow, and improve the accuracy of measurements during low flows; to install wind shields on precipitation gages where wind is obviously a factor affecting accuracy of measurement; or to remove sediment from behind weirs used to measure streamflow where deposits could affect calibration factors. Sampling procedures may be clearly defined, but limitations of the accuracy of the sampling method and measurement in hydro-meteorological observations must be understood to obtain consistent values.

In the office, the processing of data is more complicated than merely fitting some observed data into a formula and grinding out an answer. The hydrologic technicians processing data must be aware of the field conditions that may have influenced the data. They must know how to interpret field notes, select data, treat data distortions, and when to recommend discarding data.

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Additional background information is contained in the standard for the [Hydrology Series, GS-1315](#).

## TITLES

*Hydrologic Aid* is the title for positions at grades GS-1, 2, and 3.

*Hydrologic Technician* is the title for nonsupervisory positions at grades GS-4 and above in this series.

*Supervisory Hydrologic Technician* is the title for positions requiring supervisory qualifications.

## CONTENT OF STANDARD

This standard consists of two parts:

- Part I provides grade-level criteria for hydrologic aid positions grades GS-1 through GS-3. The criteria for aid positions are in a narrative format using Nature of Assignment and Level of Responsibility as classification factors.
- Part II provides grade-level characteristics for nonsupervisory hydrologic technician positions at grades GS-4 through GS-11. The criteria for the technician positions include defined levels of two classification factors to facilitate analysis, together with a grade-determination chart which identifies grade levels for various combinations of the factors.

## SUPERVISORY POSITIONS

Supervisory positions in this series should be evaluated by reference to the [Supervisory Grade-Evaluation Guide](#), Part I.

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## PART I -- EVALUATION CRITERIA GS-1 THROUGH GS-3

### Hydrologic Aid, GS-1316-1

#### Nature of Assignment

GS-1 hydrologic aids learn the basic methods, techniques, and procedures for one or a few simple tasks. They learn to make routine measurements, simple arithmetic computations and instrument readings and to record specified data. In addition, GS-1 aids help higher grade aids or technicians by performing the simplest manual tasks. GS-1 aids are not required to apply experience or familiarity directly related to specific technical tasks.

#### Level of Responsibility

As trainees, GS-1 aids receive very close supervision. Detailed instructions are furnished. Procedures, methods, and techniques are demonstrated. The aid's work is continually observed, spot checked, checked upon completion, etc., as appropriate.

## Hydrologic Aid, GS-1316-2

### Nature of Assignment

Hydrologic Aids GS-2 perform a limited variety of simple, repetitive tasks requiring a knowledge of easy-to-follow work procedures performed in a fixed or prescribed sequence. GS-2 aids receive training to acquire specific skills of the type applied by GS-3 aids.

### Level of Responsibility

GS-2 aids receive supervision which is initially as close as is typical of the GS-1 level, but which lessens as tasks recur. New methods, procedures, and techniques are demonstrated once or several times, as necessary, and/or are written out in detail. Guidelines are specific, detailed, and fully applicable. Unlike GS-1 aids, GS-2 aids performing repetitive assignments are expected to select and apply the appropriate guidelines and procedures from those they have used. Assistance is readily available when problems arise.

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## Hydrologic Aid, GS-1316-3

### Nature of Assignment

Positions at this level differ from those at GS-2 in that the work at GS-3 is characterized by required knowledge of detailed procedures which are either established and repetitive or which are specified by the supervisor at the time of initial performance, and which involve readily-acquired skills.

### Level of Responsibility

GS-3 aids receive complete, explicit oral and/or written instructions at the beginning of each assignment, covering work methods, available equipment, procedures, reference guidelines, etc. These instructions are more complex and voluminous than is typical for positions at grade GS-2. The supervisor is available for instruction and guidance at any time. GS-3 aids are expected to perform recurring tasks under supervision which gradually lessens until the more routine, recurring tasks are only infrequently spot checked or observed. The less routine tasks are occasionally checked in progress or upon completion. At grade GS-2 the supervision received is more intensive.

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## CLASSIFICATION FACTORS

The factors used in determining the grade levels for nonsupervisory hydrologic technicians are Nature of Assignment and Responsibility.

### 1. Nature of Assignment

This factor includes consideration of the knowledges, skills, and ability required to adequately perform the duties assigned to the position, as well as the nature, scope and difficulty of the work assigned. This factor has five levels, I through V. These range from the assignments of limited scope and impact performed at the lower grade levels to the highly involved, technically complicated assignments found at the higher grade levels.

### 2. Responsibility

This factor includes the kind and degree of supervision received; the intensity of review of work; the guidance furnished during the course of a cycle; the extent of the worker's authority to make decisions and apply technical judgment in the accomplishment of his assignments; and the nature of available instructions and guides. Responsibility also includes consideration of the personal contacts that the technician maintains with others and the purpose of these contacts.

This factor is described in four levels, A through D. These levels range from the limited level of responsibility found in Level A to the considerable responsibilities expected of and assumed by the mature worker described in Level D.

## EVALUATION PLAN

The levels for the two factors in this standard, Nature of Assignment and Responsibility, are described below. To evaluate a position:

1. Determine the level of each factor, and
2. Convert the resulting factor level combinations to a grade, by reference to the grade-determination chart which appears on the last page of this classification standard.

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When levels of both factors fall between the defined levels, such combined added strengths or weaknesses should be considered, with the application of sound position classification judgment, in arriving at the grade of a position.

It is important that positions fully meet the criteria for the level of the factor in order to be assigned the indicated level; the factor levels should not be applied in a mechanical fashion.



GS-4 is the level at which assignments require some background knowledge of the methods and practices in the specialized field of hydrology. Positions above grade GS-11 should be evaluated by extension of the criteria in the standard with the application of sound position classification judgment.

## FACTOR LEVEL DEFINITIONS

### FACTOR 1: NATURE OF ASSIGNMENTS

Level I -- Work entails performing procedural assignments where methods and techniques are well established. Technicians are expected to apply a limited amount of experience related to the field of hydrology in accomplishing the work. The work requires accuracy and attention to details in following a planned sequence, in checking and operating instruments, and in recognizing significant deviations in the results obtained. The most difficult aspect of the work involves the following of established detailed procedures and the specific sequence of steps in using instruments in the field, and the achieving of uniform results in acquiring and processing basic data.

Examples of work assignments:

1. Make adjustment and minor repairs to water level recorders, or other equipment used in water investigations.
2. Make routine stream discharge measurements at designated locations, under a variety of field conditions. In special projects such as pumping tests and surveys for indirect determination of discharge, set up and operate equipment, and record data as instructed.
3. Follow well-defined methods and designated formulas; compute, extract, compile and present geological or hydrologic data in prescribed tabular or graphic form. This work requires the use of arithmetic, elementary algebra, and geometry, and requires ability to recognize and correct errors which are readily apparent, e.g., misplaced decimal points and reversal of algebraic signs. These computations involve indirect measurement of streamflows using established procedures and forms for computing areas, and pumpage test data graphs. This work requires a limited knowledge of hydrology.

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Level II -- The technicians perform work that involves well-established procedures but often requires a number of sequential steps to complete a full assignment. The work performed may be a phase of a broader assignment for which professionals or technicians at a higher level have responsibility.

Because of their nature, assignments require greater accuracy and attention to detail than is found at Level I. For example, field assignments involve measurements at a

number of points requiring skill in adjusting and operating a variety of equipment. Office work involves computations which require judgment and knowledge of the nature of sources and use of the data.

Additional background in hydrologic work, and judgment over and above that required for assignments at Level I is applied, because technicians at this level consider field conditions and select appropriate auxiliary equipment or alternative methods, and must know the limitations of the equipment and methods in relation to the problems or situations they face.

Examples of work assignments:

1. Perform a variety of computations and analysis of water resource data to prepare the data for interpretative use or inclusion in reports. This work requires the use of well-established specified procedures and the application of arithmetic, geometry, algebra, and trigonometry in computing volumes, deviations from norms, etc. The nature and use to be made of the data must be understood, inconsistencies or gaps in the information recognized, and possible sources of supplemental data sought in order to complete the work.
2. Compute mean daily gage heights from water stage record charts, edit record tapes, and make corrections based on field observation notes.
3. Prepare maps showing well elevations and depth to water, hydrographs, profiles, and well locations.
4. Prepare preliminary drafts on routine phases of water resource investigations for inclusion in larger reports.
5. Collect data, to measure flood peaks indirectly, using surveying instruments such as levels and transits.
6. Prepare portions of feasibility studies for projects such as flood frequency and sediment load studies. This includes the preparation of maps, charts, hydrographs, frequency curves, and tabulations as well as making the computations leading to these items.

Level III -- The technicians perform a variety of work relating to gathering hydrologic data, or to hydrologic studies that require the application of a number of different basic established methods, procedures, and techniques. The assignments may concern the collection of data from a number of stations within a geographic area, a complete conventional study project of relatively limited scope, or a portion of a large and more diverse study project.

Assignments require the study, analysis, and consideration of several possible courses of action, techniques, and procedures, and the selection of the most appropriate.

Because circumstances which cannot be foreseen arise with greater frequency in assignments at this level than at lower levels, the technicians must be resourceful and exercise initiative in making changes or deviating from either the schedule or the procedures to incorporate additional coverage requested by higher authorities or to adjust to conditions found at the work site.

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At this level more knowledge and ability are required than at Level II. For example, technicians at Level III perform work such as planning the sequence of their assignments, and modifying procedures and schedules to satisfy requirements of the assignment.

Examples of work assignments:

1. Measure stream discharge utilizing various devices depending upon the depth of the stream and the conditions present. Observe and note conditions which may have a bearing on stage-discharge relationships. Make and compile observations of the fluctuations of ground water levels in designated wells. Collect samples of waters, both ground and surface, for chemical analysis. Oversee the repair of gage houses, recorder shelters, and related gaging structures. Arrange for employment of temporary laborers, direct their work, and make purchases of materials required for maintenance or new construction.
2. Install, adjust, inspect, and service crest-stage indicators, well-recorders, and other instruments for the collection of ground and surface water data. Check gage settings by running level circuits from established benchmarks to assure continuing accuracy of the records obtained from instruments.
3. Make technical studies of hydrologic data collected in the field, and prepare material for publication, such as, drafts, maps and other illustrative material requiring considerable judgment and experience with respect to its form and method of presentation. Apply datum corrections to gage height records allowing for periods of ice effect, temperature variations, and precipitation. Plot hydrographs, and analyze differences in hydrographs with earlier records, and after analysis make necessary changes to correct inconsistent periods. Such changes are based on a comparison of notes describing observed conditions with earlier records for these stations.
4. Perform hydrologic computations to reconstruct historical run-offs from such non-technical sources as newspaper accounts, diaries, etc., determine unit hydrographs, loss curves, synthesize flood hydrographs, and determine water supply data for historical periods.

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5. Make preliminary flood routing studies for reservoirs; compile and assemble reservoir inflow, outflow, and storage data, used by others to determine the feasible heights of flow, control dams, and the relocation elevations for existing roads, etc.
6. Collect basic field data for water quality studies, for example, temperature, acidity, dissolved oxygen, and other chemical components. Collect water and sediment samples for additional laboratory analysis. Make a record of observed conditions that would affect the interpretation of data derived from samples.

Level IV -- Technicians perform highly specialized work related to water resources investigations. The duties assigned are similar to those which may be performed by professional hydrologists or engineers. The technicians utilize highly developed skills which have been gained through continuing, intensive on-the-job training and extensive experience.

Technicians at this level apply considerable initiative and resourcefulness. They must apply seasoned judgment to determine the most effective means to obtain data during flood or under other unusual conditions. Mistakes, errors in judgment, or a lack of resourcefulness especially during these stress-filled times, may result in the loss of valuable records, accidents in field survey work, and faulty planning and design of flood prevention projects. The chief differences between this level and Level III is that the technicians must apply technical skill and knowledge to hydrologic problems that contain a number of variables that are intangible and subtle and the solutions they propose will have a continuing effect on the total water resources program in the area.

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#### Examples of work assignments:

1. Collect data and prepare reports on the ground water levels. The data consist of quarterly and annual measurements of water levels in ground water observation wells, and measurement of the amount of ground water pumped from irrigation and other wells. Proper collection of these data requires continual evaluation of the wells to insure that these wells are representative of the area in which they are located, considering water levels and the general quality of water. The technicians collect records on area wells through the cooperation of owners or well-drillers.
2. Carry out portions of multipurpose reservoir operations studies; collate stream flow, snow accumulation and melt, watershed condition, and rain-fall data, and prepare simple run-off correlations. Compute portions of multiple correlation analysis relating return flows from irrigation systems to diversions; adjust recorded flows in streams, to full natural flow, modified flow, and impaired flow. Use experience and judgment to determine the effect on run-off characteristics, make loss and gain studies from stream flows in areas using surface water measurements, climatological data, and consumptive use estimates modified to eliminate water obtained from ground water pumping in the areas under consideration. Relate water available under varying

conditions to water demands for irrigation, municipal and industrial purposes, navigation, quality control, fish and wildlife, recreation, and power generation.

3. Make reconnaissance surveys for the location of new river gaging stations. Prepare plans for gaging stations and such supporting equipment as automatic controls, cableways, and other accessories required for a complete stream-gaging facility.

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4. Compute discharge records for stream gaging stations with stage-discharge relationships made difficult to determine by stream regulation, changing slope, or variable amounts of back-water from debris, nearby streams, or control structures. Review the plotting of discharge measurements and the development of stage-discharge curves to determine the accuracy of stage discharge results obtained at a gaging station, and make recommendations for improvements in the station in order to improve the data obtained. This work requires a considerable depth of knowledge and the ability to recognize contributing factors which have an important effect upon the collection of streamflow records.

Level V -- Work entails a wide range of assignments, many requiring the modification of established procedures to fit the extremely involved nature of the hydrologic problems present. Work must be planned to employ time effectively and to integrate a number of phases of assignments.

The job assignments require continuing use of ingenuity and originality, and a high level of skill and knowledge in operating available equipment, or in meeting the practical needs caused by the environment in which studies are conducted. This level differs from Level IV in that technicians must apply broad and intensive knowledge of hydrologic concepts underlying the area of work, and skill in planning complex operations.

Examples of work assignments:

1. Plan and conduct the computation and collection of data from approximately thirty or more gaging stations; determine stage-discharge relations, compute rating tables, and mean daily, monthly, and annual discharge rates for these stations. Prepare a station analysis for each station, obtaining data for missing periods of record by extrapolation or interpolation. In addition to the difficulties described at Level IV, the work at Level V is further complicated by such considerations as, for example, a large proportion of the streams on which the gages are located have flat slopes, alluvial channels, and occasional flash floods.

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2. Act as a party chief, and make indirect-measurements of flood flows under extremely difficult conditions. Collect data including that required to compute flood flows by the slope-area method, by measurement of flow over dams, by flow through culverts, and by flow over embankments.
3. Obtain hydrologic data from published and unpublished sources and conduct hydrologic studies relative to the frequency of flood and droughts. These studies include determining the types of and time distributions of stream flows, and the analysis of the reliability of hypotheses against actual records. Make analysis of the interrelationships between topographic, physiographic, and meteorological characteristics, watershed condition, and flow frequency distributions. Prepare reports on each study.
4. Plan and coordinate a ground water survey program for an area. The area may be either a small area with complex features such as geological faults, water of varying quality, or unusual ground water-surface water interrelationships that rule out the use of conventional ground water survey methods; or a larger area with planning and coordinating problems related to the scope of the ground water survey operations. Determine need for and select locations for additional wells. Arrange for installation of recorders and conduct of field measurements to determine quantity, quality, and movement of ground water; compile, analyze, and evaluate data; and prepare reports, charts, and maps for publication.

## FACTOR 2: RESPONSIBILITY

Level A -- Routine assignments which involve conditions, concepts, and methods familiar to the technicians are made in terms of the objectives to be achieved without explicit instructions as to work methods.

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When assignments involve new, more difficult, or unfamiliar areas of work, the technicians are given more specific guidance such as the location of appropriate materials, and equipment, available manuals, texts, or previous correspondence. In addition, explicit instructions for solving technical problems involving unfamiliar conditions, methods, or concepts are provided by the supervisor.

The technical adequacy of the completed routine work is reviewed or checked for adherence to instructions; nonroutine assignments are reviewed in process.

Personal contacts are usually restricted to supervisors and coworkers and are not usually significant at this level.

Level B -- This level differs from Level A in that the technicians have more freedom and less specific guidance because they have demonstrated greater knowledge of the work and its methodology than technicians with Level A responsibilities. Technical problems

include some not previously encountered by the technicians; problems involving concepts and methods for which agency guides and precedents exist are resolved independently. Supervisors provide assistance in solving unfamiliar technical problems involving methods and concepts not covered in agency guides or precedents.

The technicians receive general oral instructions relative to such factors as the time to be allotted to certain functions, expected time of completion of assignments, possible technical problems which may be encountered, and approaches that may be used in resolving these problems. Work is given a general review for adequacy of methods employed and accuracy of results obtained at the end of each assignment, or phases of particularly long or detailed assignments.

Contact with others are typically to obtain or furnish information of a factual nature. They involve contacts with people outside the immediate organization whereas at Level A contacts are generally within the organization.

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Level C -- The technicians at this level plan and execute the work following patterns they deem most likely to achieve the objectives assigned. At the time assignments are made, technicians are provided information on related work being performed that may impinge on their efforts, and with general instructions related to the scope, objectives, time limitations, priorities, as well as other general information on aspects of the assignments. The supervisor gives more detailed instructions when distinctly new techniques are involved.

Responsibility at this level differs from that at Level B primarily in terms of significant discretion for selecting from among a greater variety of feasible alternatives. Significant deviation from established guides requires prior approval, and the technicians apply judgment needed to recognize when such approval is required.

Contacts with other people are usually to obtain or furnish information that is factual and noncontroversial, or to obtain permission from landholders for continuing access to study sites. Personal work contacts typically are more frequent and demanding than at Level B in that they often involve problems related to coordination of projects with persons in associated activities.

Level D -- Although they receive their assignments with the objectives and scope specified, the technicians have responsibility for the development of plans, the assembly, analysis and evaluation of data, and the preparation of appropriate reports. For some important projects supervisors may review and approve preliminary planning. By comparison to Level C, technicians at this level have many more opportunities for unreviewed decisions. Assignments usually run for a longer period of time, or are projects of a continuing nature

on which the technicians work with an unusual amount of autonomy. Applicable methods and techniques contain gaps, deviations, or differences which usually must be critically examined in order to make modifications prior to recording data or reporting project findings. During the course of projects of considerable duration, from time-to-time technicians may report on completed phases of the work.

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Because of the scope of assignments, contacts at this level are more extensive than at lower levels. Contacts are with cooperating agencies, both State and Federal, and private individuals and often concern problems that must be resolved in order for work on a project to proceed. While these contacts are carried out without close supervision, the technicians may discuss the general approach to be taken with supervisors, particularly when controversial matters are involved.

### GRADE-DETERMINATION CHART

Grade levels are derived by reference to the chart below after the appropriate levels of the Factor 1 -- Nature of Assignments and Factor 2 -- Responsibility assigned have been determined.

Factor 2: Responsibility	Factor 1: Nature of assignments				
	Level I	II	III	IV	V
A	GS-4	GS-5	GS-6	*	*
B	GS-5	GS-6	GS-7	GS-8	*
C	*	GS-7	GS-8	GS-9	GS-10
D	*	*	GS-9	GS-10	GS-11

\*These combinations are not likely to occur.