



CLASSIFICATION STANDARD

Scientific research

Scientific and professional category

°Minister of Supply and Services Canada 1990

PREFACE

This standard describes the plans to be used in classifying and evaluating positions in the Scientific Research Group. The standard provides an incumbent-oriented level determinant method for establishing the level of positions in the Research Scientist Sub-Group, and a point rating method for determining the relative worth of positions in the Research Manager Sub-group.

The Classification plan describes the criteria for allocating positions to the Scientific Research Group, and to the two component sub-groups. Allocation of positions to the Group is to be determined by reference to both the Category definition and the Group definition; allocation of positions to either sub-group is then to be determined by reference to the sub-group definitions.

For the Research Scientist sub-group, classification of positions and incumbents is not subject to hierarchical constraints in that the classification plan is incumbent-oriented. Determination of the classification level of a position is based on the qualification of the incumbent, and subsequent adjustment of the position level will occur as a result of the incumbent qualifying for and being promoted to the next higher classification level.

For the Research Manager sub-group however, positions are to be described and classified in the normal manner.

CATEGORY DEFINITION

Occupational categories were repealed by the Public Service Reform Act (PSRA), effective April 1, 1993. Therefore, the occupational category definitions have been deleted from the classification standards.

SCIENTIFIC RESEARCH GROUP DEFINITION

For occupational group allocation, it is recommended that you use the [Occupational Group Definition Maps](#), which provide the 1999 group definition and their corresponding inclusion and exclusion statements. The maps explicitly link the relevant parts of the overall 1999 occupational group definition to each classification standard.

INTRODUCTION - RESEARCH SCIENTIST SUB-GROUP

General Application

The classification plan is to be used for allocating positions to the Research Scientist sub-group and for determining the classification levels of those positions. The classification plan for this sub-group is "incumbent-oriented"; the plan is based on the productivity and achievement of the individual.

The classification plan recognizes that:

- scientific research is primarily an activity which produces contributions to scientific knowledge. For government scientists, scientific research must be clearly relevant to departmental mandates;
- the Research Scientist sub-group applies to scientific research positions in which the incumbents are involved in scientific research;
- the scientific research productivity and achievements of the person occupying a position in the Research Scientist sub-group determines the level of the position the individual holds;
- research scientists at all levels are responsible for maintaining a capability to function at their level; and
- promotion is based on recognition of the individual's cumulative and on-going research productivity and achievements and on demonstrated capability to function at the higher level.

Use of the level descriptions

Level descriptions outline the level of productivity and achievement required of the incumbent in order to classify the position at the particular level.

Each of the level descriptions contains:

- a general description;
- criteria;
- definitions of the criteria (in parentheses below each criterion);
- where possible, sub-criteria to facilitate understanding and application of criteria; and
- where possible, examples of how criteria and sub-criteria are evidenced.

For example, Publications is a sub-criterion of the PRODUCTIVITY criterion and examples of publications include papers of original work, technical notes or letters, memoirs, books or parts thereof, investigative reports, and unpublished confidential reports.

Research Scientist

Criteria

Promotion is based on both the continuing and cumulative productivity and achievement of the individual. To facilitate application of the classification plan, productivity and achievement are assessed through the PRODUCTIVITY criterion as well as the supplementary criteria CREATIVITY, RECOGNITION, LEADERSHIP, and SCOPE OF DECISION-MAKING, to confirm evidence of the required productivity.

Productivity may be evidenced through any of the following sub-criteria: Publications, Reviews, Innovation, Technology transfer, Cooperative research, and Leadership achievements. Undue importance shall not be accorded publications, nor disproportionate emphasis placed on quantity of publications without due regard for quality, impact and relevance to major problems and issues.

It is recognized that a scientist may not contribute in all aspects of each criterion. However, an individual scientist will usually have met most criteria requirements before being considered of promotion.

Equivalent contributions in forms other than those specified under each criterion shall also be considered, such as leadership or direction of research studies and projects, contributions to leadership in group projects or programs, responsibility for decision-making relative to planning, scheduling and coordination of activities, scientific interpretation and synthesis.

At higher levels, direction of or contributions to the research of others may be an important part of productivity. Considerations may include:

- generation of ideas for work to be done by others;
- expert advice to or consultation with other scientists, the organization as a whole, or industry;
- scientific leadership of research teams or projects.

Method of Classifying Positions and Incumbents

When an authorized person-year is to be utilized for employing a research scientist, a position is to be described by management in summary form, augmented by a normal statement of qualifications.

The allocation of the position to this sub-group is determined by the classification authority, but the classification level is not formally assigned at this stage.

The candidate is appointed by a staffing action to a classification level designated in relation to the individual qualifications of the candidate. The classification level of the position is then formally assigned, and the classification action is complete.

When a scientist is promoted to the next higher classification level while still remaining in the same position, the position classification level will be adjusted to correspond to ensure classification coincidence between the incumbent and the position.

When a position classified in this sub-group is vacated, management must reconsider the classification and future utilization of the authorized person-year before the position is filled. When a new person is appointed to the position, the classification level is to be re-evaluated based on the preceding process.

RESEARCH SCIENTIST SUB-GROUP DEFINITION

The planning, conduct and evaluation of R&D in the natural sciences within or outside the federal government.

Inclusions

Positions included in this sub-group are those (a) that meet the requirements of the group definition and (b) that require the application of comprehensive or in-depth knowledge of concepts, theories and research methods appropriate to the scientific field(s) and subject-matter areas. Of major importance in most positions is the planning and conduct of R&D studies and projects, and the interpretation and communication of results; in some positions the responsibility, as Scientific Authority, for R&D performed by the private sector under contract, or for the provision of scientific advice and leadership to others will be important.

Exclusions

Positions excluded from this sub-group are those that meet the group definition, but in which the primary responsibility is

- managing or coordinating major federal government organizations conducting R&D;
- making of major managerial decisions affecting government resources committed to R&D programs; or
- providing advice on the direction, conduct and management of R&D programs without a direct responsibility for conducting personal research.

CLASSIFICATION AND PROMOTION CRITERIA

CRITERIA	RES 1	RES 2	RES 3	RES 4	RES 5
GENERAL DESCRIPTION	normal entry level for junior research scientist or research scientist with less than average cumulative achievements	working level research scientist with average cumulative achievements	experienced research scientist with above-average cumulative achievements	mature research scientist with distinctly superior cumulative achievements	exceptional research scientist with outstanding cumulative achievements
PRODUCTIVITY					
(identifiable outputs of a scientific or technical nature)	recognized contributions to R&D	contributions in quantity and quality to evidence average competency and productivity	contributions in quantity and quality to evidence above-average competency and productivity	continued contributions in quantity and quality to evidence superior competency and productivity	continued contributions in quantity and quality to evidence outstanding competency and productivity
Productivity may be evidenced	by any of the following:				
Publications					
- papers of original work - technical notes or letters - memoirs - books, or parts - investigative reports - unpublished confidential reports	publishable additions to scientific knowledge as author or co-author	authorship or co-authorship of average # of papers of acceptable quality, or fewer of above-average quality	authorship or co-authorship of substantial # of papers of above-average quality or fewer of superior quality, demonstrating above-average R&D ability & mastery of a significant field of specialization	authorship or substantial contributions as co-author of extensive publications of superior quality or significance, demonstrating superior R&D ability & mastery of a substantial field of specialization	authorship or substantial contributions as co-author of extensive publications of excellent quality and significance, demonstrating outstanding R&D ability & leadership in a major field of specialization
Reviews	no expectation	occasional authorship or co-authorship of authoritative reviews in limited fields of knowledge	frequent authorship or co-authorship of authoritative reviews in limited fields of knowledge	authorship or co-authorship of authoritative reviews in fields of knowledge that are moderate in scope and complexity	authorship or co-authorship of authoritative reviews in fields of knowledge that are broad in scope, very complex or highly advanced

CRITERIA	RES 1	RES 2	RES 3	RES 4	RES 5
Innovation - patents - improved genetic material - improved designs - improved processes or systems	limited achievement	average achievement in creative development	above-average achievement (e.g. moderate new patents or genetic varieties)	superior achievement (e.g. significant patents or genetic varieties)	outstanding achievement (e.g. outstanding new patents or outstanding genetic varieties)
Technology Transfer - impact of technology transfer - technical publications, reports, presentations	limited degree of involvement contributions to reports having limited impact on technology transfer	average record of successful transfer of usable applied science and technology to users and clients author or co-author of a moderate number of reports having recognized impact on technology transfer	above-average record of successful transfer of usable applied science and technology with significant impact to users and clients author or co-author of a significant number of reports having recognized impact on technology transfer	superior record of successful transfer of usable applied science and technology with substantial impact to users and clients author or co-author of an extensive number of reports having major impact on technology transfer	outstanding record of successful transfer of usable applied science and technology with major impact to users and clients author or co-author of an extensive number of reports having exceptional impact on technology transfer
Cooperative Research - scientific authority	limited contributions	average record of contributions in contracted-out R&D, requiring limited definition, execution & evaluation activities	above-average record of significant contributions in contracted-out R&D, requiring definition, execution & evaluation of activities	superior record of significant contributions in contracted-out R&D, requiring extensive & original definition, execution & evaluation of activities	outstanding record of significant contributions as scientific authority in contracted-out R&D, requiring exceptional and original definition, execution & evaluation of activities g.
- joint venture projects	limited contributions	average record of significant joint venture R&D, requiring limited definition, execution & evaluation of activities	above-average record of significant joint venture R&D, requiring definition, execution & evaluation of activities	superior record of significant joint venture R&D, requiring extensive & original definition, execution & evaluation of activities	outstanding record of significant joint venture R&D, requiring exceptional and original definition, execution & evaluation of activities

CRITERIA	RES 1	RES 2	RES 3	RES 4	RES 5
- collaborative and multi-disciplinary research	limited and primarily with colleagues within the institution	average record; may involve colleagues in other institutions, or in regions and provinces	above average record of significant contributions; projects may be national in scope, requiring considerable planning and resource coordination, and possibly involving several scientists in the collaboration	superior record of significant contributions; may be international in scope, requiring extensive planning and coordination of resources and activities, and may be multidisciplinary in nature	outstanding record of significant contributions; initiator or leader of significant projects requiring exceptional degree of planning, coordination and extensive resource inputs, usually international in nature and perhaps multi-disciplinary
- contracting in	limited contributions	average record of significant contracted-in R&D, requiring limited definition, execution and evaluation of activities	above-average record of significant contracted-in R&D, requiring definition, execution & evaluation of activities	superior record of significant contracted-in R&D, requiring extensive and original definition, execution and evaluation of activities	outstanding record of significant contracted-in R&D, requiring exceptional & original definition, execution & evaluation of activities
CREATIVITY					
(imaginative approaches, concepts and ideas for the advancement of research and the development of technology)	demonstrates creativity in the modification of techniques and methods and in the generation of ideas and proposals for research and investigations	demonstrates average creativity in the conception of new techniques and methods and in the generation of ideas and proposals for research investigations	demonstrates substantial creativity in the conception of new approaches and methods where guidelines and precedents are inadequate and in the generation of significant ideas and proposals for R&D	demonstrates superior creativity in the conception of significant approaches and innovations where precedents are manifestly inadequate and in the generation of significant ideas and proposals for R&D	demonstrates outstanding creativity in the conception of major ideas, approaches and innovations where no precedents exist and in the generation of major ideas and proposals for R&D
RECOGNITION					
(stature in scientific community)	recognition at entry level	regional or collegial recognition	national recognition	national or international recognition as an authority	national and international recognition as an authority
- literature citation	no expectation	occasionally cited	regularly cited	frequently cited as a recognized authority	extensively cited as an international authority

CRITERIA	RES 1	RES 2	RES 3	RES 4	RES 5
- honours, invitations and awards	no expectation	average honours	substantial honours invited to present papers at national conferences	superior honours received national merit award session chair or panel member at national conferences	outstanding honours received international merit award conference chair or keynote speaker at national or international conference_
- role in scientific societies and committees	membership in societies	active participation in scientific societies	holds local or chapter office in scientific societies	holds office in national scientific societies serves as official delegate at national meetings and on national committees	holds executive office in national or international scientific societies serves as official delegate at national meetings and on national committees
LEADERSHIP					
- (influence on scientific community and direction of scientific programs)					
Scientific Leadership					
- consultation	consulted by fellow scientists and technicians within project	consulted by colleagues, superiors and workers in government in a restricted field of R&D	consulted within and outside government in a substantial field of R&D	widely consulted within and outside government in more than one significant field of R&D	widely consulted within and outside government in several substantial fields of R&D and on broad policy direction
Degree of influence					
- degree of influence	participates in section discussions, symposia and presentations	participates in activities in field of specialization	provides leadership in field of specialization	provides substantial leadership in more than one field of specialization	exercises substantial leadership on R&D directions taken nationally and internationally

-CRITERIA	RES 1	RES 2	RES 3	RES 4	RES 5
Program Leadership	no expectation, limited influence on establishment plans, policies and operations	no expectation, limited influence on establishment plans, policies and operations	demonstrates leadership ability, influences branch plans, policies and operations	demonstrates superior leadership ability, significant influence on departmental plans, policies and operations	demonstrates outstanding leadership ability, and has determining influence on plans, policies and operations within the department and perhaps government
SCOPE OF DECISION-MAKING					
(latitude in determination and control of work)					
Degree of supervision	under established guidelines, little discretion in setting and approach to achieving objectives	under limited guidelines, some discretion in setting and approach to achieving objectives	under minimal guidelines, significant discretion in setting and approach to achieving objectives	substantial discretion in setting and approach to achieving objectives	exceptional discretion in setting and approach to achieving objectives
Independence	participated in projects in a well-defined area of investigation	independently conducts some research, or leads a part of a significant group project	independently conducts research, or leads a part of a significant large project, including decision-making	independently conducts significant research, or acts as a prime leader of a large research project	independently conducts or leads major research, or is responsible for a high level of scientific coordination within or outside government
Judgment	under direct supervision, limited judgment exercised	under general supervision, average level of discretion in identifying, defining and selecting study	significant level of discretion in identifying, defining, selecting and carrying-out study	substantial level of discretion in identifying, defining, selecting and carrying-out study	exceptional level of discretion in identifying, defining, selecting and carrying-out study

INTRODUCTION - RESEARCH MANAGER SUB-GROUP

The position classification and evaluation plan for the Research Manager Sub-group consists of a sub-group definition and a point-rating plan.

Point-rating is an analytical, quantitative method of determining the relative value of positions. Essentially, point-rating plans define characteristics of factors common to the positions being evaluated. They define degrees of each factor and allocate point values to each degree. The total value determined for each position is the sum of the point values assigned by the raters.

Factor Point Values

Point values are assigned to each factor chosen to describe the work characteristics of the positions, in relations to increasing work difficulty. Point values assigned to each factor increase arithmetically. In the position evaluation plan the following factors, weights and point values are used:

Factors	Relative Weighting Shown as Percentage of Total Maximum Points	Point Values	
		Minimum	Maximum
1. Complexity of Decisions - Disciplines	18.75%	20	30
2. Complexity of Decisions - Number of Establishments	25.00%	10	40
3. Complexity of Decisions - Concept and Priority	18.75%	10	30
4. Impact of Assigned Responsibility	18.75%	10	30
5. Responsibility for Administration of Personnel Resources.	18.75%	0*	30
	100.00%	50	160

* not applicable to certain positions.

Research Manager

Factor Criteria

The factor criteria requires a distinction to be made between a research manager or director in which the incumbent is responsible for the conduct of a research program, and a position of research adviser or coordinator, in which the incumbent is responsible primarily for providing expert and influential advice on the planning or conduct of research without being personally accountable for a research program. Factors 1, 2, 3 and 4 apply to all positions; Factor 5 is applicable only to research managers or directors.

Use of the Position Evaluation and Classification Plan

There are four steps in the application of this position evaluation and classification plan.

1. The position description is studied to ensure understanding of the responsibilities of the position as a whole and as they relate to the characteristics of each factor. The relationship of the position being rated to positions above and below it in the organization is also studied.
2. Allocation of the position to the category, group and sub-group is confirmed by reference to the definitions and the descriptions of inclusions and exclusions and the statement of minimum qualifications.
3. A degree of each factor in the position being rated is assigned by comparison with degree definitions in the rating scales.
4. The point values for all factors are added to determine the total point rating.

Determining the Classification Level

The ultimate objective of position evaluation is to determine the relative values of positions in occupational groups and sub-groups so that position incumbents may be paid within salary ranges consistent with the relationships indicated. Positions rated within a designated range of point values are regarded as being of equal difficulty and are allocated to the same classification level.

Range of Point Values	Classification Level
50-90	1
91-120	2

RESEARCH MANAGER SUB-GROUP DEFINITION

The management or co-ordination of federal government organizations conducting R&D in the natural sciences, and the provision of scientific advice on the direction, conduct and management of these programs.

Inclusions

Positions included in this sub-group are those a) that meet the requirements of the group definition and b) in which the primary responsibilities are the exercise of scientific leadership and also a substantial and direct managerial influence on R&D programs and activities in context of one of the following:

- the management of federal governmental organization(s) for which the primary and continuing objectives are the conduct of R&D in the natural sciences, and of the resources -personnel, facilities and operating funds -- allocated;
- the co-ordination of R&D programs or activities, including determining the nature and priority of objectives and the resources committed to their achievement within and across organizations, and evaluating program outputs in relation to departmental objectives and policies;
- the provision of scientific advice on the direction, conduct and management of R&D programs.

Exclusions

Positions excluded from this sub-group are those that meet the group definition but in which the primary responsibility is

the personal conduct of substantial R&D as well as the control and coordination of projects; or

the control and coordination of contracted R&D without responsibility for one of the above mentioned inclusions.

Research Manager

FACTOR # 1 - COMPLEXITY OF DECISIONS - DISCIPLINES

This factor is used to measure the complexity of managing, coordinating, or advising on R&D in terms of the number of scientific disciplines involved.

Notes to Raters:

In the application of this factor, raters should consider only those disciplines which are directly related to the R&D implemented by the organization.

Discipline is defined as follows for use in this factor:

Two fields of scientific activity are considered as belonging to different disciplines if a research scientist would not normally be expected to transfer from one to the other, and could not transfer without a substantial amount of additional education and a considerable gap in research productivity.

Examples of disciplines are organic chemistry, bacterial genetics, plant pathology, cryptogamic botany, astrophysics, physical anthropology, invertebrate zoology, pyrometallurgy, ornithology, mycology, ichthyology, virology and endocrinology.

A discipline is identified by a generic prefix. For example, plant genetics and animal genetics are different examples of disciplines, but not wheat genetics or swine genetics. A field of scientific activity that is identified by a dual prefix, such as soil organic chemistry, should not be regarded as a discipline. Furthermore, techniques such as differential thermal analysis or thin layer chromatography should not be regarded as disciplines.

COMPLEXITY OF DECISIONS FACTOR - DISCIPLINES

Degree of Complexity	Points
A. Decisions or effective recommendations are made on the planning and/or management of R&D characterized by up to four disciplines.	20
B. Decisions or effective recommendations are made on the planning and/or management of R&D characterized by more than four disciplines.	30

FACTOR # 2 - COMPLEXITY OF DECISIONS - NUMBER OF ESTABLISHMENTS

This factor is used to measure the complexity of managerial decisions in terms of the magnitude of the organizations influenced.

Notes to Raters:

Research establishment, means an organization in which the main components are located together, or in close proximity to one another, under a single director. A sub-organization that operates as a satellite of a larger organization, and is subject to considerable administrative control by an officer of the superior organization is not considered to be a (separate) research establishment.

COMPLEXITY OF DECISIONS - NUMBER OF ESTABLISHMENTS

Degree of Complexity	Points
A. Decisions or effective recommendations are made on the planning and/or management of R&D implemented in a unit of a research establishment.	10
B. Decisions or effective recommendations are made on the planning and/or management of R&D implemented in one or two research establishments.	20
C. Decisions or effective recommendations are made on the planning and/or management of R&D implemented in three to five research establishments.	30
D. Decisions or effective recommendations are made on the planning and/or management of R&D implemented in more than five research establishments.	40

FACTOR # 3 - COMPLEXITY OF DECISIONS - CONCEPT AND PRIORITY

This factor is used to measure the difficulty of R&D planning in terms of the uncertainty of theories, concepts and expected results, and the effect of competing demands on the organization(s) being managed.

Notes to Raters:

Normally the position being rated would receive a lesser degree under this factor than the Research Manager position to which it reports.

COMPLEXITY OF DECISIONS - CONCEPT AND PRIORITY

Degree of Complexity	Points
A. Decisions or effective recommendations are made on the planning and/or management of R&D that usually presents limited problems of concept and/or priority.	10
B. Decisions or effective recommendations are made on the planning and/or management of R&D that usually presents complex conceptual problems or difficult problems or priority.	20
C. Decisions or effective recommendations are made on the planning and/or management of R&D that frequently presents extensive and complex problems of concept and/or priority.	30

FACTOR # 4 - IMPACT OF ASSIGNED RESPONSIBILITY

This factor is used to measure the difficulty and significance of managerial decision making in relation to scientific problems being investigated, ranging from problems of local interest to scientific matters of national or international concern.

Notes to Raters:

The impact of results of R&D conducted by the organization is to be considered only in relation to the geographic area, and its needs and interests which in turn influence and are affected by the scientific objectives of the organization.

IMPACT OF ASSIGNED RESPONSIBILITY FACTOR

Degree of Impact of Decisions	Points
A. Decisions or effective recommendations are made on the planning and/or management of R&D that is initiated to resolve primarily local problems.	10
B. Decisions or effective recommendations are made on the planning and/or management of R&D that is initiated to resolve primarily regional problems.	20
C. Decisions or effective recommendations are made on the planning and/or management of R&D that is initiated to resolve problems of an extensive or general nature that extend beyond a particular locality or region and have national or international connotations.	30

FACTOR # 5 - RESPONSIBILITY FOR ADMINISTRATION OF PERSONNEL RESOURCES

This factor is used to measure administrative responsibility in terms of authorized staff-years. Notes

to Raters:

This factor is not applicable to coordinator adviser positions that are not directly responsible for the administration of organizations conducting R&D.

Rating Scale

Degree of Responsibility	Points
A. Up to 25 authorized staff-years	10
B. 26 to 100 authorized staff-years	20
C. 101 - 400 authorized staff-years	30