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Social Organization Standard

T/CAS 326—2021
Replace T/CAS 326—2018

General specification of competency assessment for engineers

工程能力评价通用规范

(English Translation)

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Address of the China Association for Standardization: CAS Office, 33 Zengguang Road, Haidian District, Beijing 100048 (Bei Jing Shi Hai Dian Qu Zeng Guang Lu 33 Hao Zhong Guo Biao Xie Xie Zi Lou, You Zheng Bian Ma: 100048)

Tel: 010-68487160 Fax: 010-68486206

Website: www.china-cas.org E-mail: cas@china-cas.org

Contents

Foreword

CAS is in charge of this English translation. In case of any doubt about the contents of English translation, the Chinese original shall be considered authoritative.

The General specification of competency assessment for engineers (hereinafter referred to as the Standards) is drafted in accordance with the rules given in the GB/T 1.1-2020 *Directives for Standardization Part 1: Rules for the Structure and Drafting of Standardization Documents* and the T/CAS 1.1-2017 *Guidelines for Structure and Drafting of Social Organization Standards*.

The 2021 Standards replace the T/CAS 326-2018 General specification of competency assessment for engineers (hereinafter referred to as the 2018 Standards) in whole. In addition to some structural adjustments and editorial alterations, the following technical deviations have been made with respect to the 2018 Standards (the previous edition):

a) "Engineering Capacity Building Alliance" has been changed to "Chinese Society of Engineers" (see the "Introduction" part);

b) Additional engineering and technology fields have been added (see the "Scope" part);

c) A new section "Authorizations and Rankings" has been added which clarifies the "rankings of registered engineering members" (see Section 4);

d) The term "evaluation criteria" has been changed to "application requirements", and respective professional work experience requirements for different ranks of engineering members have been provided (see Section 5);

e) "Evaluation Procedures" and "Approval and Registration" have been integrated into "Assessment and Registration Management" which clarifies the methods for assessment and the requirements for appointing assessors (see Section 6);

f) "Annex B Code of Conduct for Engineer Members" has been moved to Section 7 (see Section 7, and Annex B of the 2018 Standards);

g) A new section "Re-registration Management" has been added, and the relevant contents from the 2018 Standards are modified and incorporated here (see Section 9 in this document and Section 6.7 in 2018 Standards);

h) The section "Self-discipline and Supervision" has been changed to "Supervision and Management" (see Section 10).

The Standards were proposed and prepared by the Chinese Society of Engineers.

Organizations involved in the drafting of the Standards include the Training and Talent Service Center of the China Association for Science and Technology, China Association for Standardization, Chinese Mechanical Engineering Society, China Society of Automotive Engineers, China Society for Electrical Engineering, Chinese Hydraulic Engineering Society, China Institute of Communications, China Railway Society, China Highway & Transportation Society, The Chemical Industry and Engineering Society of China, Chinese Nuclear Society, and The Architectural Society of China, Geological Society of China.

Individuals involved in the drafting of the Standards include Zhang Mingtian, Fang Siping, Wang Tianyi, Hao Yinbo, Luo Ping, Zhao Lianfang, Zheng Xuan, Wang Hairu, Du Tao, Teng Wei, Wu Zhuoping, Li Yang, Xiao Chang, Li Hua, Hua Wei, Xu Xiaoqing, Song Zhongnan, Liu Peng, and Wang Tao.

Attention is drawn to the possibility that some of the elements of the Standards may be the subject of patent rights. CAS shall not be held responsible for identifying any or all such patent rights.

The previous editions of the Standards and their revision history are as follows:

—First released in 2018 as T/CAS 326-2018;

—This document is the first revision.

Introduction

In order to establish an internationally equivalent competency assessment system for engineers, advance the mutual recognition of engineering qualifications internationally, and improve the professional and international levels of engineering and technical personnel in China, the China Association for Science and Technology (CAST) has established the Chinese Society of Engineers (CSE). CSE's work is severalfold, including offering comprehensive guidance for developing China's engineering competencies and providing associated competency assessment services, special research, and policy-making consultations. CSE authorizes qualified national societies, associations, and institutes affiliated with CAST to undertake specific competency assessments for engineers. Authorized national societies (hereinafter referred to as authorized societies) are entitled to administer engineering competency assessments for their members. Members who pass the assessment shall then be entitled to register as engineering members of relevant authorized societies.

The Standards are hereby formulated to standardize engineering competency assessments.

General specification of competency assessment for engineers

1 Scope

The Standards specify all the relevant components for administering engineering competency assessments, including the conditions for authorizations and rankings, application requirements, assessment and registration management, the code of conduct for engineering members, continuous professional development requirements, re-registration management, and supervision and management.

The Standards are applicable to the following engineering and technology fields:

—Civil engineering;

—Electrical engineering;

—Mechanical engineering;

—Railway engineering;

—Nuclear engineering;

—Standardization engineering;

—Water conservancy and hydraulic engineering;

—Information and communication engineering;

—Automotive engineering;

—Chemical engineering;

—Geological Engineering;

—Building and construction engineering.

2 Normative references

The Standards do not contain any normative references.

3 Terms and Definitions

For the purposes of the Standards, the following terms and definitions apply.

3.1

engineering competency assessments

assessment of an applicant by authorized societies according to application requirements and eligibility criteria

3.2

applicant

a member of an authorized society who is engaged in a relevant engineering and technology field as specified by the Standards and applies for an engineering competency assessment

3.3

assessor

assessors of the engineering competency assessments who have been identified by CSE as possessing the qualities, knowledge and skills required to conduct the assessment

3.4

registration

the procedures for an applicant to be acknowledged as an engineering member after they have passed the relevant engineering competency assessment

3.5

engineering member

a person who has registered with the authorized society and obtained the corresponding engineering membership

3.6

continuous professional development

ongoing learning, seminars and other related activities that engineering members participate in to maintain and improve their technical engineering abilities and competencies

3.7

re-registration

the procedure for engineering members to be re-qualified via assessment and obtain the corresponding engineering membership

4 Authorizations and Rankings

4.1 Authorization to be a qualified assessor

4.1.1 CSE shall formulate and issue the qualification conditions and management requirements for carrying out engineering competency assessments.

4.1.2 National societies may apply to CSE to become qualified assessors for administrating engineering competency assessments. Upon passing a review, they will be officially authorized by CSE to administer engineering competency assessments.

4.2 Ranking system for registration of engineering members

4.2.1 Engineering members are ranked as the three levels of Apprentice Engineer, Professional Engineer, and Senior Professional Engineers.

4.2.2 Applicants should apply for the corresponding ranking according to their application requirements.

4.2.3 Engineering members shall apply for higher rankings in sequence.

5 Application Requirements

5.1 Educational experience requirements

Applicants shall have a bachelor’s degree or higher in an engineering or related major, or have other relevant educational experience recognized by the authorized society.

5.2 Professional work experience requirements

5.2.1 The professional work experience required as part of the corresponding registration process should be obtained from a period following the applicant’s earning of the required academic degree or other educational experience recognized by the authorized society.

5.2.2 No relevant professional work experience is required for the application for the Apprentice Engineer ranking.

5.2.3 Applicants for the Professional Engineer ranking shall have at least five years of relevant professional work experience, including at least two years of designated Major Engineering Work Experience.

Note: The identification of Major Engineering Work Experience shall be stipulated by authorized societies according to the individual characteristics of their specific engineering and technology fields.

5.2.4 Application for the Senior Professional Engineer ranking requires at least 10 years of relevant professional work experience, including at least 5 years of designated Major Engineering Work Experience.

5.2.5 Authorized societies shall, based on the features of their particular engineering and technology fields, reduce the relevant professional work experience requirements by one to two years for applicants who obtain academic degrees in engineering or related majors accredited by a member organization of the China Engineering Education Accreditation Association (CEEAA) or other related institutions (such as the Washington Accord of the International Engineering Alliance).

5.3 Quality and competency requirements

5.3.1 Applicants for the Apprentice Engineer ranking shall meet the graduation requirements of the *Engineering Education Certification Standards* issued by CEEAA.

5.3.2 Applicants for the Professional Engineer and Senior Professional Engineer ranking shall meet the quality and competency requirements stipulated in Annex A of the Standards.

6 Assessment and Registration Management

6.1 Assessment procedures

6.1.1 Based on the features of their particular engineering and technology fields, authorized societies shall set up specific and differentiated assessment procedures for applicants for different engineering membership rankings, including the use of material reviews, written tests, oral interviews, or a combination thereof.

6.1.2 When administering engineering competency assessments, authorized societies shall seek to simplify the assessment procedures for applicants who have obtained an accredited degree in related majors according to the features of their particular engineering and technology fields.

6.1.3 CSE shall establish a database of individual assessors based on the recommendations of authorized societies. When conducting engineering competency assessments, the authorized societies shall then select relevant assessors from this individual assessor database.

- Material reviews shall be administered by at least two assessors who are engaged in the same engineering and technology field as the applicant.

- Written tests shall be evaluated and approved by at least two assessors who are engaged in the same engineering and technology field as the applicant.

— Interviews shall be carried out by a team of two to three assessors who are engaged in the same engineering and technology field as the applicant, of which at least one shall be engaged in the same or similar professional field as the applicant.

6.1.4 Authorized societies shall develop their own eligibility criteria for engineering members.

6.2 Assessment administration

6.2.1 In order to take part in engineering competency assessments, applicants shall submit the required application materials.

6.2.2 Authorized societies shall conduct preliminary reviews of the application materials to confirm they satisfy basic requirements such as those of educational and professional work experience.

6.2.3 Upon preliminary review, in case any application material is found to not satisfy a basic requirement, the authorized society shall inform the applicant of this result, and the applicant may then submit supplementary or revised materials accordingly.

6.2.4 Authorized societies shall organize and administer assessment activities according to their determined assessment procedures.

6.2.5 Authorized societies shall conduct a comprehensive review of the applicant in accordance with their eligibility criteria to determine whether or not to grant registration to the applicant. For applicants who are not eligible to register, the authorized society shall inform them of the result.

6.3 Registration management

6.3.1 For an applicant who has passed the comprehensive review, authorized societies shall publicize his/her information for no less than 5 working days. If no objection is received during this time limit, the applicant’s information shall then be directly submitted to CSE.

6.3.2 Following CSE confirmation, a unified registration number for engineering membership shall be granted to the applicant.

6.3.3 An engineering membership certificate with a validity period of 5 years shall be issued by the responsible person of the authorized society.

6.3.4 The engineering membership certificate shall contain at least the following information:

—Name of the registrant;

—Registered engineering and technology field;

—Registered ranking and serial number;

—Membership approval date and validity period;

—Photo of the registrant;

—Logo of CSE;

—The official seal of the authorized society and the signature of its responsible person.

6.3.5 Authorized societies shall promptly announce the successful registration status of their engineering members, and such announcements shall contain at least the following information:

—Name of the registrant;

—Registered engineering and technology field;

—Registered ranking and serial number;

—Membership approval date and validity period.

6.3.6 Authorized societies shall stipulate the requirements for the registration and management of their engineering members, including defining the conditions and procedures for the suspension, resumption, cancellation, and revocation of the membership certificate. All such information shall be disclosed publicly.

7 Code of Conduct for Engineering Members

Engineering members shall sign a statement pledging to abide by the following Code of Conduct:

—Comply with the requirements of laws, regulations and engineering rules, and uphold the reputation of the country, CSE, other engineering related parties, authorized societies, and themselves;

—Cherish posts and devote wholeheartedly to work, fulfill duties with due diligence, and do not undertake professional engineering work beyond one's current capabilities;

—Assume public safety, health and happiness as fundamental principles;

—In order to prevent and reduce adverse effects on public health, safety, environment or society, work to establish a comprehensive, coordinated and sustainable development philosophy that integrates quality, occupational health and safety, energy conservation, and environmental awareness into engineering practices;

—Treat others with respect and fairness, and stop or report to relevant authorities any dangers, risks, cases of negligence or misconduct which affect others adversely;

—For any controversial public event related to their own technical fields, recognize and act on their duty to help explain the event to the public from a professional perspective.

—Do not exploit their expert or professional knowledge to commit deception or fraud;

—Respect and emphasize the value of protecting intellectual property rights, fulfill their essential duties of confidentiality, avoid unfair competition, and reject bribery and all forms of corruption;

—Continuously seek to maintain and improve one’s engineering competencies while encouraging and helping others to do so as well;

—Avoid unnecessary conflicts of interest and safeguard the legitimate rights and interests of the stakeholders of engineering projects;

—The membership certificate shall become invalid during any period of suspension, cancellation and revocation of engineering membership.

8 Continuous Professional Development (CPD)

8.1 While the engineering membership certificate remains valid, engineering members shall earn at least 40 credit hours annually by participating in relevant CPD activities.

Note: Credit hours shall be based on activities that last at least 45 minutes.

8.2 Relevant CPD activities include but are not limited to:

—Participating in knowledge training or examinations in related engineering and technology fields;

—Attending seminars and other learning activities in related engineering and technology fields;

—Participating in activities such as formulating standards and conducting research in related engineering and technology fields;

—Publishing professional articles or books in related engineering and technology fields;

—Giving professional lectures or conference speeches in related engineering and technology fields;

—Providing technical consultations and other similar services in related engineering and technology fields;

—Other professional activities in related engineering and technology fields.

8.3 CSE or authorized societies shall formulate a CPD activity plan for engineering members on an annual basis which shall specify the credit hours of each activity.

8.4 Authorized societies shall reasonably determine corresponding credit hours in the case that their engineering members participate in a CPD-related activity not organized by CSE or the authorized society.

8.5 In the case that an engineering member is unable to complete their annual CPD activities on time due to illness or other special reasons, the relevant authorized society shall formulate corresponding plans.

9 Re-registration Management

9.1 Engineering members shall re-register once every five years, and apply for re-registration to their authorized society three months prior to the due date or within twelve months after their valid registration certificate expires.

9.2 The requirements for engineering members' application for re-registration include but are not limited to:

—Being compliant with the Code of Conduct requirements throughout the registration period;

—Completing the required amount of CPD activities during the registration period;

—Continuing to be engaged in relevant professional work when re-registering;

—Duly resolving any issues such as suspension of qualifications, complaints, etc., if any;

—Other relevant requirements put forward by the authorized societies.

9.3 For engineering members who meet re-registration requirements, CSE and the corresponding authorized society shall grant re-registration, and the new certificate shall be valid for 5 years from the expiry date of the original certificate.

9.4 In the case that an applicant fails to meet the requirements of re-registration, the authorized authority will reject re-registration and inform the applicant of the result.

10 Supervision and Management

10.1 Supervision

10.1.1 CSE shall guide and supervise authorized societies' engineering competency assessment activities. For any authorized societies which are discovered to have issues, depending on the severity of the problem, CSE shall require them to rectify such issues within a certain time limit, or suspend or revoke their status as an authorized society.

10.1.2 Authorized societies shall establish an avoidance system to ensure the fairness of all related procedures, including application acceptance, assessment, and registration.

10.1.3 CSE, authorized societies and their relevant staff are obliged to keep all assessment-related information confidential and shall not disclose it to third parties (unless required by law) in order to ensure information security.

10.1.4 Authorized societies shall promptly disclose information to the public and notify CSE in case of suspension, resumption, cancellation, and withdrawal of any engineering member certificates.

10.1.5 All individuals and groups may submit their comments or suggestions to CSE regarding engineering competency assessments.

10.2 Appeals and complaints

10.2.1 CSE and authorized societies shall establish their own systems for openly receiving appeals, complaints and feedback through a set of separate channels.

10.2.2 Where an applicant objects to his/her assessment results, he/she may file an appeal to the authorized society.

10.2.3 Applicants may file a complaint with CSE directly if their authorized societies violate procedures and rules regarding the administration of engineering competency assessments.

10.2.4 Engineering members may file a complaint with either their authorized societies or CSE regarding improper management actions taken by the authorized societies.

10.2.5 Authorized societies and CSE shall promptly accept and properly handle relevant appeals and complaints, retain handling procedures and documentation, and promptly notify the results to relevant applicants or engineering members.

Annex A
(Normative)
Quality and Competency Requirements for Engineering Members

Professional Engineers shall meet the requirements as stipulated in Table A.1.

Table A.1 Quality and Competency Requirements for Professional Engineers

Quality and Competency	Requirements
A. Engineering Knowledge and Professional Competency	A1 Have an engineering-related education background for engineering; have acquired basic and professional engineering knowledge and undergone related professional skills training.
	A2 Be proficient in solving problems by using mathematics, natural sciences, engineering fundamentals and professional knowledge and skills.
	A3 Be able to collect, analyze, and judge relevant technical information, regardless of being in a domestic or foreign setting, and be competent at conducting research on complex engineering issues, and proposing corresponding research directions, approaches and solutions.
	A4 Have capacity in conducting market research, demand forecasting and technical and economic analysis, and be able to formulate and implement effective engineering plans, and evaluate their effects and impacts.
	A5 Be good at thinking systematically and creatively, and proposing innovative solutions.
B. Engineering Ethics and Professional Ethics	B1 Comply with laws and regulations, technical specifications, and codes of conduct during engineering practices.
	B2 Have rich humanistic and social science literacy and a sense of social responsibility; understand and abide by engineering and professional ethics and norms in engineering practices; perform their own responsibilities.
	B3 Have a professional awareness of quality, safety, energy conservation, environmental protection, and intellectual property protection, and be able to correctly use professional knowledge to promote the harmonious development of engineering, nature and society.
C. Teamwork and Communication Skills	C1 Be skilled in utilizing engineering language to develop useful engineering documents and communicate well with colleagues.
	C2 Have a good sense of team spirit and good interpersonal relationships, and be able to control oneself and understand others.
	C3 Possess intercultural communication competencies, and be able to conduct international exchanges and cooperation.
D. Continuous Development and	D1 Formulate and implement their own career development plans, while actively participating in activities for continuous professional development.

Lifelong Learning	D2 Actively follow the development trends of domestic and foreign technologies, and be able to continuously acquire new knowledge and skills and apply them to engineering practices.
E. Leadership and Project Management	E1 Have capacity for building and managing a team, and be able to lead the team and help team members develop themselves.
	E2 Have capacity for project monitoring and process management, and be able to predict risks, propose risk mitigation plans, and promote continuous improvement in engineering projects through quality management.
	E3 Have capacity for comprehensive analysis and judgment, and be able to demonstrate good judgment in the implementation of engineering projects.
	E4 Put forward opinions during the decision-making process, while assuming the responsibility for the decisions made.

Senior Professional Engineers shall meet the requirements as stipulated in Table A.2.

Table A.2 Quality and Competency Requirements for Senior Professional Engineers

Quality and Competency	Requirements
A. Engineering Knowledge and Professional Competency	A1 Have an engineering-related education background; have acquired basic and professional engineering knowledge and undergone related professional skills training.
	A2 Be proficient in solving problems flexibly by using mathematics, natural sciences, engineering fundamentals and professional knowledge and skills.
	A3 Be able to collect, analyze, and judge relevant technical information, regardless of being in a domestic or foreign setting, and be competent at conducting research on complex engineering issues, and proposing corresponding research directions, approaches and solutions.
	A4 Have strong capacity in conducting market research, demand forecasting and technical and economic analysis, and be able to formulate and implement effective engineering plans, and accurately evaluate their effects and impacts.
	A5 Be good at thinking systematically and creatively, and proposing innovative solutions.
B. Engineering Ethics and Professional Ethics	B1 Comply with laws and regulations, technical specifications, and codes of conduct during engineering practices.
	B2 Have rich humanistic and social science literacy and a sense of social responsibility; understand and abide by engineering-related professional ethics and norms in engineering practices; perform their own responsibilities..
	B3 Have a professional awareness of quality, safety, energy conservation, environmental protection, and intellectual property protection, and be able to fully use professional knowledge to promote the harmonious development of engineering, nature and society.
C. Teamwork and Communication Skills	C1 Be skilled in utilizing engineering language to develop useful engineering documents and communicate well with colleagues.
	C2 Have a good sense of team spirit and good interpersonal relationships, and be able to control themselves and exactly understand others.
	C3 Possess intercultural communication competencies, and be able to fully conduct international exchanges and cooperation.
D. Continuous	D1 Formulate and implement their own career development plans, while actively participating

Development and Lifelong Learning	in activities for continuous professional development.
	D2 Actively follow the development trends of domestic and foreign technologies, and be able to continuously acquire new knowledge and skills and apply them to engineering practices.
E. Leadership and Project Management	E1 Have strong capacity for building and managing a team, and be able to lead the team and help team members develop themselves in a comprehensive way.
	E2 Have strong capacity for project monitoring and process management, and be able to predict risks accurately, propose risk mitigation plans, and promote continuous improvement in engineering projects through quality management.
	E3 Have strong capacity for comprehensive analysis and judgment, and be able to demonstrate excellent judgment in the implementation of engineering projects.
	E4 Put forward scientific opinions during the decision-making process, while assuming the responsibility for the decisions made.

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