ICS 35.040
CCS A 17

团 体 标 准

T/CABC 18.1—2025

条码师岗位能力要求

Barcode specialist position competency requirements

2025-11-16 发布　　2026-01-01 实施

中国条码技术与应用协会　发布
中国标准出版社　出版

目　　次

前　言

本文件按照 GB/T 1.1—2020《标准化工作导则　第 1 部分：标准化文件的结构和起草规则》的规定起草。

请注意本文件的某些内容可能涉及专利。本文件的发布机构不承担识别专利的责任。

本文件由广西职业技术学院提出。

本文件由中国条码技术与应用协会归口。

本文件起草单位：广西职业技术学院、中国条码技术与应用协会、中国物品编码中心、老挝国家工商总会（LNCCI）、老挝物品编码中心（GS1 Laos）、河北省人才服务中心、安徽省质量和标准化研究院、北京市标准化研究院、浙江省质量科学研究院、浙江宁波原产地赋码产业联盟、北京中电中采数据服务有限公司、贵州轻工职业大学、贵州财经职业学院、哈尔滨市标准化研究院、河北省标准化研究院、河南城建学院、河南省标准化和质量研究院、河南省纤维纺织产品质量监测检验研究院、河南省检验检测研究院集团有限公司、河南双汇投资发展股份有限公司、湖南财经工业职业技术学院、湖南现代物流职业技术学院、怀化职业技术学院、江门职业技术学院、联通数字科技有限公司、辽宁省标准化研究院、洛阳师范学院、南京市标准化研究院、山东轻工职业学院、四川省质量与标准化研究院、威海市产品质量标准计量检验研究院、西安交通工程学院、新维吾尔自治区质量基础发展研究院、郑州铁路职业技术学院、百世物流科技（中国）有限公司、中国物品编码中心大连办事处、平顶山工业职业技术学院、平顶山市华豫永新机动车服务有限公司、广西物流职业技术学院。

本文件主要起草人：吴砚峰、梁栋、Xaybandith Rasphone、魏保平、梁海权、田金禄、于娇、尚书山、李立、周淑民、阮晓芳、余丽燕、岳希忠、韩颖、李铮、郭锐、金琳、侯晨阳、雷濠宁、杨士民、殷文正、汪启航、刘姗姗、韩良浩、王嘉、许辰、闫晋文、郭旭、朱海强、梁鹏飞、滕丽娜、董玥、冯柠、陈晓蓉、王少然、位玉佩、夏文燕、巩向玮、茹克百提·艾尔肯、尹国友、魏新红、岳永强、周树甫、潘立龑、刘琼珂、刘艳平、米志强、翦象慧、谢艳梅、赵彪、张玥、谢红英、曾囿儒、赵明凤、周梦茗、李默雷、崔庚宇、李丹莉、郭宇飞、朱铭、赵晨阳、赵朕、姜巍、高选祥、杨志明、李国富、李怡霖、吴鹏凯、韩云凤、刘乃莹、王劲然、齐凯、林宇春、翟春霞、阿斯亚·买买提依明、程泽炯、陆光耀、李鹏程。

引　言

随着信息技术的飞速发展，条码技术与物联网、大数据、人工智能等新兴技术的融合趋势愈发明显。条码专业人才不仅要掌握条码技术原理与规范，还需具备条码系统设计与开发、符号生成与检测、设备运营与维护、技术应用与推广、教育培训与标准编制等专业技能；需要具备跨领域的知识与技能，能够将条码技术与其他前沿技术有机结合，实现数据的深度挖掘与分析，为企业决策提供更具价值的支持。

在此背景下，制定一套科学、系统、完善的条码师岗位能力标准迫在眉睫。本文件将明确条码师应具备的知识体系、技能水平与职业素养，为条码人才的培养、选拔与评价提供权威依据，有助于规范条码行业人才市场，提升条码专业人才的整体素质与业务能力，进而推动条码技术在各行业的深入应用与创新发展，为经济社会的数字化转型注入强劲动力。

条码师岗位能力要求

1 范围

本文件界定了条码师岗位能力的基本要求和专业能力要求。

本文件适用于条码师的选拔和培养。

2 规范性引用文件

本文件没有规范性引用文件。

3 术语和定义

下列术语和定义适用于本文件。

3.1

条码 bar code

由一组规则排列的条、空组成的符号，可供机器识读，用以表示一定的信息，包括一维条码和二维条码。

[来源：GB/T 12905—2019，2.1]

3.2

条码字符 bar code character

按一定规则排列的若干条和空的组合，用于表示一个数字、字母或符号。

[来源：GB/T 12905—2019，2.14]

3.3

条码字符集 bar code character set

某种条码所能表示的字符的集合。

[来源：GB/T 12905—2019，2.15]

3.4

一维条码 linear bar code；one-dimensional bar code

只在一维方向上表示信息的条码符号。

[来源：GB/T 12905—2019，2.2]

3.5

二维条码 two-dimensional bar code；2D code

在二个维度方向上都表示信息的条码符号。

[来源：GB/T 12905—2019，2.3]

3.6

商品条码 bar code for commodity

由一组规则排列的条、空及其对应代码组成，表示商品代码的条码符号，包括零售商品、储运包装商品、物流单元、参与方位置等的代码与条码标识。

[来源：GB 12904—2008，3.1]

3.7

物流单元　logistics units

在供应链过程中为运输、仓储、配送等建立的包装单元。

[来源:GB/T 18127—2009,3.1]

3.8

储运单元　storage and transportation unit

物流活动中用于储存和运输的商品集合单位,可以是单个商品的集合,也可以是不同商品的集合。通常采用 ITF-14 条码或 UCC/EAN-128 应用标识条码进行标识。

3.9

ITF-14 条码　ITF-14 code

含有校验符且定长为 14 位的交插二五条码。用于标识不在零售端结算的贸易项目,一般用在商品外包装箱上。

[来源:GB/T 12905—2019,3.1.8]

3.10

GS1-128 条码　GS1-128 code

128 条码的子集,GS1 体系的数据结构专用。

[来源:GB/T 12905—2019,3.1.13]

3.11

托盘编码　pallet coding

为单个可重复使用托盘分配的唯一编码。

3.12

条码师　bar code specialist

从事条码系统设计与开发、符号生成与检测、设备运营与维护、技术应用与推广、教育培训与标准编制等工作的专业人员。

4　岗位能力基本要求

4.1　等级划分

按岗位能力要求高低,条码师岗位能力等级设为初级、中级和高级。

4.2　初级资格

初级资格应具备高中阶段教育学历或高级中等教育毕业同等学历,且应至少具备下列条件中的 1 项:

——有 1 年以上条码技术工作经验;

——参加过条码相关知识学习且有培训证明。

4.3　中级资格

中级资格应具备大学专科及以上学历,且应至少具备下列条件中的 1 项:

——有 3 年以上的条码技术工作经验,且在条码相关项目中担任技术骨干;

——近 3 年中有累计不少于 6 个月从事一线条码技术实践经历,或坚持每 3 年到一线进行连续不少于 3 个月的条码工作专业实践;

——近 3 年指导团队或参与团队获得条码技术相关行业奖项或荣誉。

4.4 高级资格

高级资格应具备大学本科及以上学历，且应至少具备下列条件中的 2 项：

——有 5 年以上从事条码技术工作经历，且至少 2 年担任主要技术负责人；

——近 3 年中有累计不少于 6 个月从事一线条码技术实践经历，或坚持每 3 年到一线进行连续不少于 3 个月的条码工作专业实践；

——近 3 年指导团队或参与团队获得条码技术相关行业奖项或荣誉；

——近 3 年主持完成或主要参与完成至少 1 项市级以上本条码相关专业的技术研究项目或应用示范项目。

5 专业能力要求

5.1 理论知识

条码师初、中、高 3 个等级专业能力所要求的理论知识，至少应涵盖表 1 所规定的范围。

表 1 条码师专业能力要求理论知识

序号	等级	知识模块	知识点
1	初级条码师	条码基础概念	理解条码技术的产生背景与发展历程，明确条码在信息识别领域的基本作用
2			掌握物品编码、信息编码的基本定义，熟悉代码设计的简单原则，能区分常见的编码术语
3			了解条码与编码的关系，知晓条码是编码的一种载体表现形式
4		条码标识与质量基础	理解物品编码标识的基本概念，能区分分类码、标识码、属性编码的不同用途
5			了解条码符号设计的基本要素，包括条码符号尺寸、颜色搭配的常规要求
6			掌握条码识读原理，了解条码符号质量检测的基本方法，知晓影响条码印刷质量的常见因素
7		常见条码技术应用	掌握一维条码的基本概念、分类及特点，能识别常见的一维条码码制（如 EAN-13、UPC、Code 128 等），了解其在零售等场景的简单应用
8			了解二维码的基本概念、分类，能识别常见的二维码码制（如 QR 码、Data Matrix 等），知晓其在简单信息存储场景的应用
9			了解条码在供应链、电子商务等领域的基础应用逻辑，如条码在零售环节的商品标识应用
10	中级条码师	编码与条码系统知识	掌握编码信息系统的组成、运作流程，能理解编码信息系统在企业信息管理中的作用
11			深入理解 GS1 编码标识体系，包括 GS1 系统的特点、技术体系架构，熟悉 GS1 编码体系涉及的各类代码（如 GTIN、GLN 等）
12			掌握 GS1 数据载体体系，包括一维条码、二维码和无线射频识别技术的基础原理，能区分不同数据载体在 GS1 系统中的应用场景
13			熟悉常用条码的相关标准及法律法规，如商品条码国家标准、条码应用的法律规范等，确保条码应用的合规性
14			掌握规范合法使用条码的知识，包括条码注册、备案、使用的全流程合规要求，能识别并规避条码使用中的法律风险
15			理解基于条码的相关系统的运行原理，如条码识读系统、条码数据管理系统等的技术架构与运作逻辑

表 1　条码师专业能力要求理论知识（续）

序号	等级	知识模块	知识点
16	中级条码师	条码质量与应用深化	掌握条码质量控制的详细方法，能分析条码质量问题实例，提出针对性的改进建议
17			深入理解二维码技术与应用，包括二维码主要码制的编码原理、信息存储特点，熟悉二维码在汉信码、商品二维码等场景的深度应用
18			理解我国物品编码标准体系，包括物品编码标准体系框架、物品基础编码系统、物品应用编码系统、商品条码系列标准，能运用标准体系解决实际编码问题
19			具备企业标准制修订和基础教材编写的知识，能参与企业内部条码应用标准的制定、修订工作，且可编写条码知识普及、技能培训类基础教材
20		行业应用拓展	理解编码在供应链的应用，包括供应链管理概述、GS1 与供应链管理、编码在生产、运输、零售等环节的应用细节，能为企业供应链条码应用提供优化方案
21			理解编码在物联网的应用，包括物联网概述、物联网技术、物联网标识体系、物联网数据采集与分析，能结合物联网技术规划条码应用场景
22			理解编码在电子商务的应用，包括电子商务中的条码应用、二维码与 O2O 模式、二维码与移动支付、条码与快递跟踪等场景的深度融合应用
23	高级条码师	编码与条码技术前沿	掌握 GS1 数据共享体系，包括电子数据交换技术、XML 技术、全球数据同步网络、产品电子代码信息服务，能构建企业间编码数据共享机制
24			深入研究编码在追溯体系的应用，包括追溯基本概念、追溯原则、内部追溯与外部追溯、追溯系统设计、GS1 编码在追溯中的应用，能主导大型产品追溯系统的条码应用规划
25			了解编码在医疗、工业互联网、人工智能等前沿领域的应用趋势，能预判条码技术在这些领域的创新应用方向
26			精通条码技术标准在零售、仓库管理、物流单元、物流中心的应用，能结合不同场景的业务流程，制定针对性的条码应用标准与实施方案
27		标准化与体系构建	精通我国物品编码标准体系，能参与或主导企业乃至行业级物品编码标准的制定与优化，确保编码体系的规范性和扩展性
28			掌握编码技术标准化的前沿动态，能结合国际国内标准（如 GS1 标准、国内条码行业标准），为企业构建符合未来发展的条码标准化体系
29			具备地方标准以上级别标准制修订和高级培训教材编写知识，能主导地方、行业甚至国家级条码相关标准的制修订工作，且可编写面向专业人员的高级条码技术培训教材
30		综合应用与决策	能基于编码技术，为企业提供从编码设计、条码载体选择、质量控制到全流程应用的综合解决方案，涵盖供应链、物联网、电子商务等多领域的融合应用
31			具备条码技术与其他信息技术（如大数据、人工智能、区块链）的整合能力，能利用条码数据为企业数字化转型提供决策支持
32			掌握物流及供应链管理的基本理论、流程及优化方法的知识，能结合条码技术对物流及供应链流程进行优化，提升整体效率

5.2　实践操作技能

条码师初、中、高 3 个等级专业能力所要求的实践操作技能，至少应涵盖表 2 所规定的范围。

表 2　条码师专业能力要求实践操作技能

序号	等级	技能维度	核心实践技能
1	初级条码师	设备操作与基础应用	熟练操作主流条码生成软件，能根据需求设置条码类型、尺寸、颜色参数，生成符合基础规范的条码标签
2			熟练使用条码打印机，掌握耗材安装、打印浓度调节、标签校准等基础操作，解决卡纸、打印模糊等常见问题
3			熟练操作条码扫描设备，能完成条码识读、数据初步核验，判断扫描失败原因
4			基础数据录入与核对：将扫描获取的条码数据导入Excel或简易管理表格，完成数据与实物的匹配核对，确保基础信息准确
5		基础质量把控	能使用简易条码质量检测工具，初步判断条码清晰度、对比度是否符合使用要求
6			协助完成条码标签的粘贴与维护，确保在仓储、零售场景中标签粘贴位置规范，避免因粘贴不当导致识读困难
7	中级条码师	业务办理与编码规范	独立完成商品条码办理全流程：包括向编码中心提交企业资质材料、填写申请表格、跟进审核进度、领取厂商识别代码，以及条码续展、变更等后续业务
8			结合企业产品分类与管理需求，配合技术负责人编制商品代码，严格遵循“唯一性、稳定性、无含义性”原则，建立企业内部编码台账，避免编码重复或混乱
9			条码合规性审核：能对照《商品条码管理办法》等法规，检查企业内部及合作方使用的条码是否合规，识别并纠正编码错误、冒用条码等问题
10		项目实施与系统运维	制定物流条码技术应用项目实施方案：开展需求调研，完成系统架构设计，集成基础AI算法，编写测试用例并组织系统测试，制定上线切换计划及人员培训方案
11			负责条码相关系统的日常运行维护，包括系统登录权限管理、数据备份与恢复、解决设备连接故障、软件版本更新等问题
12			运用计算机编程技术处理条码数据，实现数据批量导入导出、异常数据筛选
13			能调用基础人工智能模型，优化条码识别准确率（如针对破损、变形条码的识读优化）
14		培训与标准编制	开展基础理论知识培训：编写培训课件，面向企业一线员工（如仓管员、收银员）开展实操培训，通过案例讲解、现场演示、学员实操考核，确保学员掌握基础技能
15			主导企业内部条码应用标准编制：结合行业规范与企业实际，编写《企业条码编码管理规范》《条码标签打印与使用标准》等文件
16			组织企业内部条码应用标准的评审与发布
17			编写条码知识普及手册、设备操作指南等基础教材，确保内容通俗易懂、可落地
18	高级条码师	供应链优化与技术创新	基于条码技术优化供应链全流程：分析供应链各环节的痛点，如库存盘点效率低、订单分拣错误率高
19			设计供应链条码应用方案，如生产环节批次条码追溯、仓储“一物一码”管理
20			落地供应链条码应用方案后跟踪效果，通过数据对比验证优化成效
21			结合区块链技术创新条码系统：将区块链技术融入条码追溯系统，实现供应链数据不可篡改
22			结合人工智能技术创新条码系统：引入机器学习预测模型，通过条码数据关联分析，优化库存补货策略
23			探索条码与物联网技术融合，提升复杂场景下的数据采集效率

表 2　条码师专业能力要求实践操作技能（续）

序号	等级	技能维度	核心实践技能
24	高级条码师	定制化系统设计	主导定制化条码系统的技术选型：对比不同技术方案的可行性
25			协调开发团队完成定制化条码系统的开发
26			组织定制化条码系统的用户验收
27			制定定制化条码系统的长期迭代规划
28		高级培训与标准制定	开展专业知识培训：面向中级条码师或企业技术骨干，开设条码系统架构设计、AI算法在条码中的应用、供应链条码优化等高级课程
29			通过案例教学、小组研讨，提升学员专业能力
30			主导地方标准以上级别标准制修订：参与行业协会或标准化组织的条码相关标准制定工作
31			负责地方标准以上级别条码相关标准的草案编写
32			组织地方标准以上级别条码相关标准的调研论证、意见征集与修改
33			编写高级培训教材，内容涵盖前沿技术与复杂场景解决方案，满足专业人员深度学习需求

参 考 文 献

[1] GB 12904—2008 商品条码 零售商品编码与条码表示
[2] GB/T 12905—2019 条码术语
[3] GB/T 16830—2008 商品条码 储运包装商品编码与条码表示
[4] GB/T 18127－2009 商品条码 物流单元编码与条码表示
[5] GB/T 31005—2014 托盘编码与条码表示
[6] GB/T 38920—2020 危险废物储运单元编码要求
[7] GB/Z 45262—2025 标准化教育课程建设指南 编码技术标准化与应用
[8] 张成海.条码技术与应用:本科分册[M].3版.北京:清华大学出版社,2025.
[9] 张成海等.条码技术与应用:高职高专分册[M].3版.北京:清华大学出版社,2025.
[10] 张成海.条码[M].北京:清华大学出版社,2022.

中国条码技术与应用协会
团 体 标 准
条码师岗位能力要求
T/CABC 18.1—2025
*
中 国 标 准 出 版 社 出 版 发 行
北京市朝阳区和平里西街甲2号(100029)
网址 www.spc.net.cn
总编室:(010)68533533　发行中心:(010)51780238
读者服务部:(010)68523946
中国标准出版社印刷
各地新华书店经销
*
开本 880×1230　1/16　印张 1　字数 17 千字
2025年12月第1版　2025年12月第1次印刷
*
书号:155066·5-18296　定价 38.00 元

T/CABC 18.1-2025

ICS 35.040
CCS A 17

Group Standard

T/CABC 18.1—2025

Barcode specialist position competency requirements

条码师岗位能力要求

（*English Translation*）

Issue date：2025-11-16 **Implementation date**：2026-01-01

Issued by China Association for Bar Code Technology and Application
Published by China Standards Press

Contents

Foreword

This document 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*.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The issuing body of this document shall not be held responsible for identifying any or all such patent rights.

This document was proposed by Guangxi Vocational and Technical College.

This document was prepared by the China Association for Bar Code Technology and Application.

Drafting units of this document: Guangxi Vocational & Technical College, China Association for Bar Code Technology and Application, Article Numbering Center of China (GS1 China), Lao National Chamber of Commerce and Industry (LNCCI), Commodity Code Center Lao (GS1 Laos), Hebei Province Personnel Service Center, Anhui Institute of Quality and Standardization, Beijing Institute of Standardization, Zhejiang Institute of Quality Sciences, Zhejiang Ningbo Origin Coding Industry Alliance, Beijing Zhongdian Zhongcai Data Service Co., Ltd., Guizhou Light Industry Polytechnic University, Guizhou Vocational College of Finance and Economics, Harbin Institute of Standardization, Hebei Institute of Standardization, Henan University of Urban Construction, Henan Provincial Institute of Standardization and Quality Research, Henan Inspection and Testing Institute Group Co., Ltd, Henan Provincial Institute for Quality Monitoring and Inspection of Textile Products, Henan Shuanghui Investment & Development Co., Ltd, Hunan Financial & Industrial Vocational-Technical College, Hunan Modern Logistics College, HuaiHua Vocational & Technical College, Jiangmen Polytechnic, China Unicom System Integration Limited Corp, Liaoning Institute of Standardization, Luoyang Normal University, Nanjing Institute of Standardization, Shandong Vocational College of Light Industry, Sichuan Institute of Quality and Standardization, Weihai Institute of Metrology and Inspection for Product Quality Standard, Xi'an Traffic Engineering Institute, Xinjiang Uygur Autonomous Region Institute of Quality Infrastructure Development, Zhengzhou Railway Vocational & Technical College, Best Express, Dalian Office of Article Numbering Center of China, Pingdingshan Industrial College of Technology, Pingdingshan Huayu Yongxin Motor Vehicle Service Co., Ltd, Guangxi Logistics Vocational and Technical College.

The main drafters of this document: Wu Yanfeng, Liang Dong, Xaybandith Rasphone, Wei Baoping, Liang Haiquan, Tian Jinlu, Yu Jiao, Shang Shushan, Li Li, Zhou Shumin, Ruan Xiaofang, Yu Liyan, Yue Xizhong, Han Ying, Li Zheng, Guo Rui, Jin Lin, Hou Chenyang, Lei Haoning, Yang Shimin, Yin Wenzheng, Wang Qiuhang, Liu Shanshan, Han Lianghao, Wang Jia, Xu Chen, Yan Jinwen, Guo Xu, Zhu Haiqiang, Liang Pengfei, Teng Lina, Dong Yue, Feng Ning, Chen Xiaorong, Wang Shaoran, Wei Yupei, Xia Wenyan, Gong Xiangwei, Rukebaiti Aierken, Yin Guoyou, Wei Xinhong, Yue

Yongqiang, Zhou Shufu, Pan Linyan, Liu Qiongke, Liu Yanping, Mi Zhiqiang, Jian Xianghui, Xie Yanmei, Zhao Biao, Zhang Yue, Xie Hongying, Zeng Youru, Zhao Mingfeng, Zhou Mengming, Li Molei, Cui Gengyu, Li Danli, Guo Yufei, Zhu Ming, Zhao Chenyang, Zhao Zhen, Jiang Wei, Gao Xuanxiang, Yang Zhiming, Li Guofu, Li Yilin, Wu Pengkai, Han Yunfeng, Liu Naiying, Wang Jinran, Qi Kai, Lin Yuchun, Zhai Chunxia, Asiya Maimaitiyiming, Cheng Zejiong, Lu Guangyao, Li Pengcheng.

Introduction

With the rapid development of information technology, the integration trend of barcode technology with emerging technologies such as the Internet of Things, big data, and artificial intelligence has become increasingly evident. Barcode professionals not only need to master the principles and norms of barcode technology, but also possess professional skills such as barcode system design and development, symbol generation and detection, equipment operation and maintenance, technical application and promotion, education and training, and standard formulation; they need to have cross-disciplinary knowledge and skills, capable of integrating barcode technology with other cutting-edge technologies to achieve in-depth data mining and analysis, providing more valuable support for business decisions.

Based on this background, it is urgent to establish a scientific, systematic, and comprehensive competency standard for barcode specialists. This document will clearly define the knowledge system, skill level and professional ethics that barcode specialists should possess, providing authoritative basis for the cultivation, selection and evaluation of barcode talents, and helping to standardize the talent market in the barcode industry, improving the overall quality and business capabilities of barcode professionals, and thereby promoting the in-depth application and innovation development of barcode technology in various industries, improve the digital transformation of the economy and society.

Barcode Specialist Position Competency Requirements

1 Scope

This document defines the scope of the basic requirements and professional capabilities for the barcode specialist position.

This document is applicable to the selection and training of barcode specialist.

2 Normative references

This document does not have any normative reference.

3 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

3.1
bar code

A symbol composed of an arrangement of bars and spaces according to specified rules, machine-readable for conveying information. Includes linear barcode and two-dimensional barcode

[Source: GB/T 12905—2019, 2.1]

3.2
bar code character

A series of combinations of lines and spaces arranged according to certain rules are used to represent a number, letter or symbol

[Source: GB/T 12905—2019, 2.14]

3.3
bar code character set

The set of characters that a certain bar code can represent

[Source：GB/T 12905—2019，2.15]

3.4
linear bar code；one-dimensional bar code

A barcode symbol that represents information only in a one-dimensional direction

[Source：GB/T 12905—2019，2.2]

3.5
two-dimensional bar code；2D code

Bar code symbols that represent information in both two-dimensional directions

[Source：GB/T 12905—2019，2.3]

3.6
bar code for commodity

A barcode symbol consisting of bars，spaces，and corresponding codes arranged under standardized rules to identify commodities. Codes and barcode markings include those for retail items，transport-storage packages，logistics units，party locations，etc

[Source：GB 12904—2008，3.1]

3.7
logistics units

The packaging units established during the supply chain process for transportation，storage，distribution，etc

[Source：GB/T 18127—2009，3.1]

3.8
storage and transportation unit

A collection unit of commodities for storage and transportation in logistics activities，which may consist of identical or different products. Typically identified using ITF-14 barcode or GS1-128 application identifier barcode

3.9
ITF-14 code

An interleaved 25 bar code with a check digit and a fixed length of 14 characters. It is used to identify trade items that are not settled at the retail end，and is typically used on the outer packaging of goods

[Source：GB/T 12905—2019，3.1.8]

3.10
GS1-128 code

A subset of the 128 bar code, specifically designed for the data structure of the GS1 system

[Source: GB/T 12905—2019, 3.1.13]

3.11
pallet coding

The unique identification assigned to individual reusable pallets

[Source: GB/T 31005—2014]

3.12
bar code specialist

Professionals engaged in the design and development of barcode systems, symbol generation and detection, equipment operation and maintenance, technical application and promotion, education and training, as well as standard formulation

4 Position competency fundamental requirements

4.1 Grading

Barcode specialists are classified into three grades based on competency levels: Junior, Intermediate, and Advanced.

4.2 Junior qualification

Education requirement: High school education or equivalent. Additionally, candidates must satisfy at least one of the following conditions.

- One or more years of barcode technology experience.
- Completion of barcode-related training with certification.

4.3 Intermediate qualification

Education requirement: Associate degree or higher. Additionally, candidates must satisfy at least one of the following conditions.

- 3 or more years of barcode technology experience including service in a core technical role on relevant projects.

- 6 or more months of front-line barcode practice accumulated within the last three years, or commitment to consecutive 3-month frontline practice every 3 years.

- Guidance or participation in teams receiving barcode technology industry awards or honors within the last 3 years.

4.4 Advanced qualification

Education requirement: Bachelor's degree or higher. Additionally, candidates must satisfy at least 2 of the following conditions:

- 5 or more years in barcode technology work including at least 2 years as principal technical lead;

- 6 or more months of front-line barcode practice accumulated within the last 3 years, or commitment to consecutive three-month frontline practice every 3 years;

- Guidance or participation in teams receiving barcode technology industry awards or honors within the last three years;

- Leadership or major participation in having completed one municipal-level barcode technical research project or application demonstration project within the last three years.

5 Professional competency requirements

5.1 Theoretical knowledge

The theoretical knowledge required by the professional competence of the three levels of barcode specialist, junior, intermediate and advanced, should cover at least the scope specified in Table 1.

Table 1—Professional Competency Requirements for Barcode Specialists: Theoretical Knowledge

Number	Grade	Knowledge Modules	Knowledge Points
1	Junior Barcode Specialist	Barcode Basics	Understand the background and development history of barcode technology, and clarify the basic role of barcode in the field of information recognition
2			Master the basic definitions of item codes and information codes. Be familiar with the simple principles of code design, and be able to distinguish common coding terms
3			Understand the relationship between barcode and encoding. Be aware that barcode is a form of expression for encoding

Table 1（*continued*）

Number	Grade	Knowledge Modules	Knowledge Points
4	Junior Barcode Specialist	Barcode Identification and Quality Foundation	Understand the basic concepts of item coding labels, and be able to distinguish the different purposes of classification codes, identification codes, and attribute codes
5			Understand the basic elements of barcode symbol design, including the conventional requirements for barcode symbol size and color combinations
6			Master the principle of barcode reading. Understand the basic methods for quality inspection of barcode symbols, and be aware of the common factors that affect the printing quality of barcode
7		Common Barcode Technology Applications	Master the basic concepts, classification and characteristics of one-dimensional barcode. Be able to recognize common one-dimensional barcode formats, such as EAN-13, UPC, Code 128, etc., and understand their simple applications in scenarios such as retail
8			Understand the basic concepts and classifications of two-dimensional (2D) barcode. Be able to recognize common 2D barcode formats, such as QR codes, Data Matrix, etc., and be aware of their applications in scenarios involving the storage of simple information
9			Understand the basic application logic of barcode in areas such as supply chain and e-commerce, such as the application of barcode in the identification of goods in the retail sector
10	Intermediate Barcode Specialist	Encoding and Barcode System Knowledge	Master the composition and operation process of the coding information system, and be able to understand the role of the coding information system in enterprise information management
11			Gain a deep understanding of the GS1 coding identification system, including the characteristics of the GS1 system and its technical architecture. Be familiar with various codes involved in the GS1 coding system, such as GTIN, GLN, etc
12			Master the basic principles of the GS1 data carrier system, including one-dimensional barcode, 2D barcode and radio frequency identification technology, and be able to distinguish the application scenarios of different data carriers in the GS1 system
13			Be familiar with the relevant standards and laws and regulations for common barcode, such as the national standards for product barcode and legal norms for barcode applications, to ensure the compliance of barcode usage
14			Master the knowledge of using barcode in a standardized and legal manner, including the entire process of barcode registration, filing, and usage compliance requirements. Be able to identify and avoid legal risks in the use of barcode
15			Understand the operating principles of related systems based on barcode, such as barcode reading systems and barcode data management systems, including their technical architectures and operational logic

Table 1（*continued*）

Number	Grade	Knowledge Modules	Knowledge Points
16	Intermediate Barcode Specialist	Barcode Quality and Application Deepening	Master the detailed methods of barcode quality control. Be able to analyze examples of barcode quality issues and proposing targeted improvement suggestions
17			Gain a deep understanding of 2D barcode technology and its applications, including the encoding principles and information storage characteristics of the main 2D barcode formats, and be familiar with the in-depth applications of 2D barcode in scenarios such as Han Xin Code and two dimensional code for commodity
18			Understand the article numbering standard system of China, including the framework of the article numbering standard system, the basic article numbering system, item application coding system, series of commodity barcode standards. Be able to use the standard system to solve practical coding problems
19			Have knowledge of enterprise standard formulation and revision, as well as the compilation of basic textbooks. Be able to participate in the formulation and revision of barcode application standards within the enterprise. Also capable of compiling basic textbooks on barcode knowledge and training skills
20		Expansion of industry applications	Understand the application of coding in the supply chain, including an overview of supply chain management, GS1 and supply chain management, as well as the detailed application of coding in production, transportation, retail and other links. Be able to provide optimization solutions for enterprises' supply chain barcode applications
21			Understand the application of encoding in the Internet of Things (IoT), including an overview of the IoT, IoT technologies, IoT identification systems, and IoT data collection and analysis. Be able to plan barcode application scenarios in combination with IoT technologies
22			Understand the application of encoding in e-commerce, including the integration of barcode applications in e-commerce, 2D barcode and O2O models, 2D barcode and mobile payment, and barcode and express delivery tracking scenarios
23	Advanced Barcode Specialist	The Latest Developments in Coding and Barcode Technology	Master the GS1 data sharing system, which includes electronic data exchange technology, XML technology, global data synchronization network, and product electronic code information service. Be able to establish a mechanism for sharing encoded data among enterprises
24			In-depth study of the application of coding in the traceability system, including the basic concepts of traceability, traceability principles, internal traceability and external traceability, traceability system design, and the application of GS1 coding in traceability. Be able to lead to the planning of barcode applications for large-scale product traceability systems

Table 1（*continued*）

Number	Grade	Knowledge Modules	Knowledge Points
25	Advanced Barcode Specialist	The Latest Developments in Coding and Barcode Technology	Understand the application trends of coding in cutting-edge fields such as healthcare, industrial internet, and artificial intelligence enables one to predict the innovative application directions of barcode technology in these areas
26			Proficient in barcode technology standards and their applications in retail, warehouse management, logistics units, and logistics centers. Capable of formulating targeted barcode application standards and implementation plans based on different business processes in various scenarios
27		Standardization and System Construction	Proficient in China's article numbering standard system, capable of participating in or leading the formulation and optimization of article numbering standards at both enterprise and industry levels, ensuring the standardization and scalability of the coding system
28			Master the cutting-edge trends of coding technology standardization, and be able to integrate international and domestic standards, such as GS1 standards and domestic barcode industry standards. Be able to help enterprises establish a barcode standardization system that is in line with future development
29			Possess knowledge of standard formulation and revision at the local standard level or above, as well as the compilation of advanced training materials. Be capable of leading the formulation and revision of local, industry, and even national barcode-related standards, and also able to write advanced barcode technology training materials for professionals
30		Comprehensive Application and Decision-Making	Based on coding technology, provide enterprises with comprehensive solutions covering the entire process from coding design, barcode carrier selection, quality control to application. These solutions cover multiple fields such as supply chain, IoT, and e-commerce, and are integrated applications
31			Have the ability to integrate barcode technology with other information technologies, such as big data, artificial intelligence, and blockchain, and be able to utilize barcode data to provide decision support for the digital transformation of enterprises
32			Master the basic theories, processes and optimization methods of logistics and supply chain management. Be able to optimize the logistics and supply chain processes by integrating barcode technology, and improve the overall efficiency

5.2 Practical operational skills

The practical operation skills required for the three levels of professional capabilities, junior, intermediate, and advanced of the barcode specialist should at least cover the scope specified in Table 2.

Table 2—Practical Operation Skills Required for Barcode Specialist Professional Capabilities

Number	Grade	Skill Dimensions	Core Practical Skills
1	Junior Barcode Specialist	Equipment Operation and Basic Applications	Proficient in operating mainstream barcode generation software. Be capable of setting the type, size and color parameters according to requirements, and generate barcode labels that comply with basic standards
2			Proficient in using barcode printers. Be capable of performing basic operations, such as installing consumables, adjusting print density, and calibrating labels. Be able to solve common problems like paper jams and blurry prints
3			Proficient in operating barcode scanning equipment, capable of performing barcode reading, conducting preliminary data verification, and identifying the reasons for scanning failures
4			Data entry and verification. Import the barcode data obtained through scanning into Excel or a simple management table. Complete the matching and verification of data with the physical items, and ensure the accuracy of the basic information
5		Basic Quality Control	Use the simple barcode quality inspection tool to preliminarily determine whether the clarity and contrast of the barcode meet the usage requirements
6			Assist in the application and maintenance of barcode labels, ensuring that the label placement is correct in storage and retail environments, and preventing difficulties in reading due to improper application
7	Intermediate Barcode Specialist	Business Processing and Coding Specifications	Independently complete the entire process of handling commodity barcode, including submitting enterprise qualification materials to the coding center, filling out application forms, following up on the review progress, obtaining the manufacturer identification code, and subsequent business such as barcode renewal and modification
8			Based on the classification and management requirements of the enterprise's products, in conjunction with the technical supervisor, the product codes should be compiled. Strictly follow the principles of "uniqueness, stability, and lack of meaning". An internal coding ledger should be established within the enterprise to avoid code duplication or confusion
9			Barcode compliance audit. Compare with regulations, such as the "Regulations on the Management of Product Barcode", to check whether the barcode used by the enterprise and its partners are compliant. Be able to identify and correct errors in coding, as well as issues such as the misuse of barcode

Table 2（*continued*）

Number	Grade	Skill Dimensions	Core Practical Skills
10	Intermediate Barcode Specialist	Project Implementation and System Operation and Maintenance	Develop the implementation plan for the logistics barcode technology application project. Conduct demand research, complete system architecture design, integrate basic AI algorithms, write test cases and organize system testing, formulate the plan for online switch and personnel training
11			Take charge of the daily operation and maintenance of barcode-related systems, including system login permission management, data backup and recovery, troubleshooting of equipment connection issues, and software version updates, etc
12			Utilize computer programming technology to process barcode data, enabling batch import and export of data, as well as the screening of abnormal data
13			Invoke basic artificial intelligence models to optimize the accuracy rate of barcode recognition, such as optimizing the reading of damaged or deformed barcode
14		Training and Standard Development	Carry out training on basic theoretical knowledge. Develop training courseware, conduct practical training for front-line employees of the enterprise, such as warehouse managers, cashiers, through case explanations, on-site demonstrations, and student practical assessment, to ensure that students master basic skills
15			Lead the formulation of internal barcode application standards within the enterprise. Based on industry norms and the actual situation of the enterprise, compile documents such as "Enterprise Barcode Coding Management Specifications" and "Barcode Label Printing and Usage Standards"
16			Organize to review and release the standards for barcode applications within the enterprises
17			Compile basic textbooks such as barcode knowledge popularization manuals and equipment operation guides, ensuring that the content is easy to understand and can be implemented
18	Advanced Barcode Specialist	Supply Chain Optimization and Technological Innovation	Optimize the entire supply chain process based on barcode technology. Analyze the pain points in each stage of the supply chain, such as low efficiency in inventory counting and high error rate in order sorting
19			Design a supply chain barcode application solution, such as batch barcode traceability in the production process and "one item, one barcode" management in the warehouse
20			After implementing the supply chain barcode application solution, track the effect and verify the optimization results through data comparison
21			Integrate blockchain technology with barcode system. Incorporate blockchain technology into the barcode traceability system to ensure the unalterability of supply chain data

Table 2（*continued*）

Number	Grade	Skill Dimensions	Core Practical Skills
22	Advanced Barcode Specialist	Supply Chain Optimization and Technological Innovation	Integrate artificial intelligence innovation into the barcode system. Incorporate machine learning prediction models, through barcode data correlation analysis, to optimize inventory replenishment strategies
23			Explore the integration of barcode and IoT technology to enhance the efficiency of data collection in complex scenarios
24		Customized System Design	Lead the technical selection of the customized barcode system. Compare the feasibility of different technical solutions
25			Coordinate the development team to complete the development of the customized barcode system
26			Organizate customized barcode system user acceptance testing
27			Formulate the long-term iteration plan for the customized barcode system
28		Advanced Training and Standard Setting	Conduct professional knowledge training. For intermediate barcode technicians or key enterprise technical personnel, offer advanced courses such as design of barcode system architecture, application of AI algorithms in barcode, and optimization of supply chain barcode
29			Through case studies and group discussions, enhance the professional capabilities of the trainees
30			Take the lead in formulating and revising standards at higher levels than local standards. Participate in the formulation of barcode-related standards for industry associations or standardization organizations
31			Take charge of the drafting of draft standards related to barcode at the local standard level and above
32			Carry out research and argumentation, opinion collection and revision of barcode-related standards at the level above local standards
33			Develop advanced training materials, covering cutting-edge technologies and complex scenario solutions, to meet the in-depth learning needs of professionals

Bibliography

[1] GB/T 12905—2019 Bar code terminology
[2] GB 12904—2008 Bar code for commodity—Retail commodity numbering and bar code marking
[3] GB/T 16830—2008 Bar code for commodity—Dispatch commodity numbering and bar code marking
[4] GB/T 31005—2014 Numbering and symbol marking of pallets
[5] GB/T 38920—2020 Coding requirements for dispatch unit of hazardous waste
[6] GB/Z45262—2025 Course development guide for education about standardization—Standardization and application of numbering technology
[7] Zhang C H, et al. *Barcode Technology and Application: Undergraduate Volume* (3rd ed.). Tsinghua University Press,2025.
[8] Zhang C H, Zhang D, Zhang Z Q, et al. *Barcode Technology and Application: Vocational College Volume* (3rd ed.).Beijing:Tsinghua University Press,2025.
[9] Zhang, C. H. *Barcode*. Beijing:Tsinghua University Press,2022.

China Association for Bar Code Technology and Application

Barcode specialist position competency requirements

T/CABC 18.1—2025

*

Publisher:Standards Press of China
A2,Hepinglixijie,Beijing,China,100029
Tel: (+ 86 10)68533533 51780238 68523946
http://www.spc.net.cn
NUBN：155066・5-18770
Price: ¥38.00

T/CABC 18.1-2025