

ICS 01.040.27

CCS F 02

NB

**ENERGY INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

NB/T 20580.6-2021

**Budget estimation norm of nuclear power plant construction project
works - Part 6: Automation control instrument and communication
equipment installation engineering for nuclear island**

核电厂建设工程概算定额 第6部分：核岛仪控仪表及通信安装工程

Issued on: January 7, 2021

Implemented on: July 1, 2021

Issued by: National Energy Administration of the PRC

Table of Contents

Explanation of this Volume	1
Chapter 1 Process Detection Instruments	5
Chapter 2 Process Control Instruments	27
Chapter 3 Centralized Detection Devices and Instruments	37
Chapter 4 Centralized Monitoring and Control Devices	45
Chapter 5 Installation and Commissioning of Industrial Computer Equipment	49
Chapter 6 Instrument Piping Laying, Heat Tracing and Degreasing	55
Chapter 7 Installation of Instrument Panels, Boxes, Cabinets and Accessories	69
Chapter 8 Generic Cabling System Works	77
Chapter 9 Communication System Equipment Installation Works	93
Chapter 10 Automatic Fire Alarm System Works	103
Chapter 11 Security Protection System Works	133

Foreword

This document was issued on 7 January 2021 by the National Energy Administration of the PRC and takes effect on 1 July 2021.

It is a NB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

It is classified under ICS 01.040.27, Chinese classification F 02.

This document has been drafted in accordance with the rules given in GB/T 1.1-2020 Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents.

This document is Part 6 of NB/T 20580 Budget estimation norm of nuclear power plant construction project works. The following parts of NB/T 20580 have already been issued:

Part 1: Nuclear island civil works;

Part 2: Nuclear island mechanical equipment installation works;

Part 3: Nuclear island piping installation works;

Part 4: Nuclear island ventilation and air conditioning installation works;

Part 5: Nuclear island electrical installation works;

Part 6: Nuclear island automation control instrument and communication installation works;

Part 7: Conventional island building works;

Part 8: Conventional island thermal equipment installation works;

Part 9: Conventional island electrical equipment installation works.

This document was proposed by the Nuclear Power Standardization Technical Committee of the Energy Industry.

This document is under the jurisdiction of the Nuclear Industry Standardization Research Institute.

Drafting organizations of this document: China Nuclear Power Engineering Co., Ltd.; CGN Engineering Co., Ltd.; China Electric Power Planning and Engineering Institute.

Main drafters of this document: Fu Yi, Liu Bin, Rong Mei, Hu Jiang, Lai Xiaofeng, Wang Yi, Yu Rong, Zhang Li, Yao Yongchun, Peng Qiong, Hu Xuefeng.

1 Scope

NB/T 20580.6-2021 is Part 6 of the Chinese budget estimation norm series for nuclear power plant construction. The distinction from the NB/T 20358 series matters: a budget estimation norm is used earlier in a project, at the preliminary design and budget estimate stage, and its items are coarser and cover larger blocks of work than the detailed budget quotas applied once the design is fixed. This part prices the installation of automation and control instrumentation together with communication equipment in the nuclear island - transmitters and sensors, thermocouples and resistance thermometers, radiation monitors and analysers, instrument racks and control cabinets, impulse lines and instrument tubing, telephone and public address systems, industrial television, and the cable, tray and termination work that connects them, through to calibration and loop checking. Each norm item states the work content it includes, the unit of measurement, the labour hours by trade, the machine-shift consumption and the material quantities. The volume explanation at the front sets the scope, the general provisions on what each rate already includes, the adjustment coefficients for working conditions, and the measurement rules, with chapter notes adding the conventions specific to each group. One note on the original: the scope paragraph in the volume explanation carries wording copied from Part 2 and refers to mechanical equipment installation - an error in the printed document that does not change what the norms themselves cover.

This norm specifies the norms for nuclear island mechanical equipment installation works within the budget estimation norm of nuclear power plant construction project works (wording as printed on the page).

This norm applies to the nuclear island works of new-build and extension projects of

pressurized water reactor nuclear power units, and to those sub-items of BOP works having nuclear safety requirements, such as the nuclear island waste liquid storage tank building, the conventional island waste liquid storage tank building, the auxiliary building for treatment of radioactive solid waste, the temporary storage facility for solid waste, the radioactive machinery repair shop and the decontamination workshop. Other reactor types and nuclear projects may take this norm as a reference.

2 Explanation of this Volume - General Explanation

This norm shall be applied together with the Cost norm for nuclear island building and installation works of nuclear power plant construction projects and the Cost norm for machine-team of nuclear power plant construction projects.

The norm is the basis for compiling the preliminary design budget estimate, for setting the investment control plan, for carrying out technical and economic analysis and comparison, and for controlling the construction drawing budget; it is also the basis for compiling budget estimation indices.

The norm has been compiled for normal natural conditions and environment, on the basis of a reasonable construction organization design and a matched set of construction machinery at the present technical stage, taking into account reasonable overlapping (cross) operations, and in accordance with the relevant technical standards for pressurized water reactor nuclear power plants, the construction and acceptance codes, the quality assurance outline, the safe operating procedures and the requirements for civilized and safe construction and environmental protection on site.

The consumption of labor, materials and construction machinery in the norm reflects the construction technical level and organizational level of nuclear power plant construction at the present stage. Except where adjustment is expressly permitted in the norm, no adjustment may be made on account of differences in construction organization, working method or material loss of a given project.

Labor cost of the norm is stipulated as follows:

- 1) The labor input of this norm is expressed in comprehensive workdays, without distinction of trade or technical grade; each comprehensive workday is counted as an eight-hour working day.
- 2) The comprehensive unit price of this norm is calculated with a production worker labor cost of 135 yuan per workday, which includes basic wages, wage-type allowances, auxiliary wages, employee welfare expenses and labor protection expenses.

This norm has been compiled for the following normal construction conditions:

- 1) Equipment, finished products, semi-finished products and components are complete and undamaged, conform to the quality standards and design requirements, are accompanied

by certificates of conformity and test records, and their supply meets the installation schedule.

- 2) Cross operations between the installation works and the civil works are normal, and the civil works do not affect the normal construction of the installation works.
- 3) The installation location, the buildings, the equipment foundations and the embedded openings and sleeves all conform to the design standards and satisfy the installation requirements.
- 4) The on-site installation conditions conform to the design requirements and satisfy the technical conditions.
- 5) Water and power supply meet the normal use of the installation construction.
- 6) The geographical environment and climatic conditions do not affect the normal work or the physical health of the installation workers. For construction in a special environment, the cost shall be calculated separately in accordance with the relevant provisions.

Material cost is stipulated as follows:

- 1) The materials in this norm comprise the main materials, auxiliary materials and sundry materials directly consumed in the installation work content; the material consumption comprises the quantity used directly in the installation work content, the quantity apportioned and the stipulated loss.
- 2) Material loss comprises transport loss from the site warehouse, the site stacking area or the site processing area to the installation location, construction operation loss and site stacking loss.
- 3) Materials whose unit price is not indicated in this norm are treated as main materials; their price is not included in the base price and shall be calculated at actual price on the basis of the quantities listed.
- 4) Materials used in very small quantities in this norm, whose influence on the base price is negligible, are combined as other material cost and are entered into the material cost calculated in yuan as the unit.
- 5) The consumption rates of the main materials of the installation works are given in the relevant chapters of the norm and of the budget norm.
- 6) Material unit prices are taken at material warehouse prices, and the material transport and miscellaneous charge is 2.5 percent.

The usage fee of construction machinery is stipulated as follows:

- 1) The usage fee of construction machinery in the norm is expressed by the machine-team consumption.