

# **NVC Packaging Professional II**

## **Final attainment levels and examination requirements**

© Stichting NVC Examens  
File name: Examination Requirements NVC Packaging Professional II  
Publication date: 28 February 2014  
Approved by Stichting Examenkamer

## Table of Contents

General information.....	1
1. Packaging management .....	2
1.1 Introduction to packaging.....	2
1.2 Operations management .....	3
1.3 Packaging design .....	5
1.4 Legislation and regulations .....	5
1.5 Marketing.....	6
2. Packaging materials/packages.....	7
3. Technologies.....	9
4. Packaging processes and products .....	10
5. General skills .....	12
6. Additional information.....	12

## General information

Candidates that want to take the exam NVC Packaging Professional II, should preferably be in possession of the diploma NVC Packaging Professional I or have successfully completed Higher (technical) Professional Education.

The examination candidate must demonstrate sufficient knowledge of the state of the art and should have insight into the management aspects of packaging projects. This is tested through a written and oral examination. A successful candidate demonstrates the ability to analyse, innovate, and direct – with a helicopter view – and to take responsibility for integral packaging processes and market-product-packaging combinations (MPP's).

These final attainment levels (the subjects that should be tested) and examination requirements (the way of testing) apply to all NVC Packaging Professional II Exams. Changes to these final attainment levels and examination requirements are made in accordance with the Regulations and Appeals Procedure NVC Packaging Professional (see Additional Information).

The final attainment levels are arranged according to main and subtopics.

# 1. Packaging management

## 1.1 Introduction to packaging

Have insight into:

- the way the production and marketing chain is set up and the place and role of the packaging function in it
- the requirements for market-product-packaging combinations coming from the production and marketing chain
- supply chain processes in the packaging chain
- the integral assessment of the various supply chain aspects
- the interaction between packaged products and their surroundings (preservation methods, assortment changes, and the influence of the packaging system)
- the factors that need to be evaluated for supply-chain-oriented packaging design

Have knowledge of:

- the definition and goal of packaging (as an activity)
- the functions of packaging
- the factors that influence the choice of packaging material and packaging system
- elements of the supply chain
  - products, raw materials, and preparation
  - packaging materials
  - preservation and packaging technology
  - distribution and sales channels
  - the consumer
  - legislation and enforcement
  - environmental aspects
- the influence of shelf life and storage conditions (microbial, organoleptic, water activity, oxygen sensitivity)
- the influence of the interaction between the product and the packaging material (migration, volatile substances)
- the influence of the composition and the permeability (moisture and oxygen) of packages
- the influence of specific requirements (user group and convenience aspects)

Have the skills to:

- set up a supply chain evaluation
- use a functional basic structure
- evaluate the contribution of packaging to the supply chain result
- identify aspects that are important for supply chain optimisation
- indicate the interaction between and among a product, its packaging, and its surroundings
- indicate what function the packaging has in improving shelf life for both open and closed packaging systems

Demonstrate:

- a critical attitude towards suboptimisations
- attentiveness to taking into account all relevant aspects in a supply chain evaluation
- consciousness of the place and field of influences in the supply chain his/her company operates in
- attentiveness to new product-packaging combinations and the way the interaction between and among product, packaging and surroundings takes place

## 1.2 Operations management

### Logistics

Have insight into:

- the connection between marketing and logistics
- the meaning of customer service for logistics
- the functions of procurement and the meaning of procurement for logistics
- the logistical concept and the basic logistical model
- the customer order decoupling point
- the inventory management function and inventory management systems
- the connection between distribution systems and mode of transport
- the logistic consequences of packaging processes
- logistics-friendly packaging design
- the application possibilities of the production control systems

Have knowledge of:

- the function of stock
- the forms of production organisations
- the function of product control systems
- the distribution channels and costs
- the terms logistics, procurement logistics, production logistics, distribution logistics, reverse logistics, crossdocking, batch picking, SIT, OPT, MRP, etc.
- logistic objectives and basic forms, performance indicators and control, and information and planning systems

Have the skills to:

- apply the logistic concept, the basic logistic forms, and the concept of a customer order decoupling point (CODP)

Demonstrate:

- attentiveness to new developments in logistics and their consequences for packaging
- attentiveness to movement of goods

### Integral quality assurance

Have insight into:

- the principle and the relevance of integral quality assurance
- the organisation around integral quality assurance
- the requirements for operations management
- the relevance of integral quality assurance for packaging
- the expenses and revenues associated with integral quality assurance
- the system and process approach to integral quality assurance

Have knowledge of:

- the relevant terminology
- the essence of integral quality assurance
- the basic elements of setting up an integral quality assurance system
- the control systems

Have the skills to:

- indicate how an integral quality assurance system has to be set up
- indicate changes in the company for the purpose of integral quality assurance

Demonstrate:

- a process approach to integral quality assurance

## **Statistics**

Have insight into:

- the basic concepts of statistics
- the connection between statistics and packaging practice
- the connection between population and sample and the various errors in conclusions
- the population, the sample, and the risk
- the concept of probability
- the diagram and the interpretation
- the distribution of probability of the sample results compared with reality
- the role and interpretation of tolerances; SPC, production character
- regression analysis and design of experiments

Have knowledge of:

- population and sample
- observations
- averages and standard deviations
- diagrams and charts
- the definitions of probability, dependence, independence, and permutations
- some calculation rules
- binomial and normal distributions
- representativeness and sample size
- the distribution of means and variance relative to the population
- confidence intervals/uncertainty
- setting up tests and hypotheses/design of experiments
- covariance, prediction, population means, population distribution, and regression

Have the skills to:

- calculate the mean and standard deviation
- reproduce data in the form of a histogram or column or pie chart
- calculate with permutations and probabilities
- interpret diagrams
- define samples and indicate the pitfalls
- articulate the concept of bias
- recognise efficiency
- determine and interpret confidence intervals
- define and test hypotheses and interpret the results
- determine, evaluate, and interpret the connection between and among variables

Demonstrate:

- the ability to use statistics as an effective means for handling packaging projects



### 1.3 Packaging design

Have insight into:

- the thematic approach of packaging (design) projects
- the logic of the design process
- the value of a systematic approach for complex design problems for making rational decisions

Have knowledge of:

- the basic cycle for design and the various stages it has
- the steps in the analysis phase in detail
- the influence of shelf life and storage conditions (microbial, organoleptic, water activity, and oxygen sensitivity)
- the influence of the interaction between the product and the packaging material (migration, volatile substances)
- the influence of the composition and the permeability (moisture and oxygen) of packages
- the influence of specific requirements (user group and convenience aspects)

Have the skills to:

- independently set up and manage a packaging design project
- use design methodologies as a tool
- approach a design problem systematically
- name some tools for each stage and be able to use them
- formulate a problem definition
- define a programme of requirements and use it to test ideas

Demonstrate:

- attentiveness to gaps in a packaging design project
- a critical attitude towards a good design process
- the ability to assess the limitations of the design methodologies and determine the moment at which the thematic approach of a problem is useful

### 1.4 Legislation and regulations

Have insight into:

- the consequences of national and international laws, directives, and regulations in the field of packaging and packaged products
- the field of activity and the content of the most important legislation for packaging specific products, including food products

Have knowledge of:

- the consequences of national and international laws, directives, and regulations in the field of packaging and packaged products
- the implications of the legislation in the (member) states as a consequence of the implementation of European directives and regulations
- legislation for packaging specific product categories such as food products, technical products, and dangerous goods
  - public health and hygiene (Food and Drugs Act/Commodities Act, HACCP, FDA, GMP, labelling, etc.)
  - declarations, quality marks, and symbols
  - general environmental legislation
  - brand protection and patents
  - producer responsibility



Have the skills to:

- Indicate the consequences for the company or national and international laws, directives, and regulations in the field of packaging and packaged products

Demonstrate:

- attentiveness to changes in legislation and the meaning of these for the company

## 1.5 Marketing

Have insight into:

- the essence of the operational and tactical aspects of the task of the marketer
- the role packaging plays in the marketing mix, branding, and brand line policy

Have knowledge of:

- marketing terminology up to NIMA-A level
- marketing activities up to NIMA-A level
- specific packaging aspects of marketing
- the role packaging can fulfil in positioning a brand, product, or range of products

Have the skills to:

- understand what the consequences are for positioning and behaviour in the market of all decisions that have to do with packaging and the packaging process
- actively get into discussions with marketing and sales representatives to enable them to proactively use all the possibilities packaging can offer to improve the marketing of their products

## 2. Packaging materials/packages

### In general

By materials we mean all materials that can be used for packaging, including packaging glass, paper, folding boxboard, solid board, corrugated cardboard, metal, biopolymers and other plastics, and combinations of these.

Have insight into:

- the possibilities of each individual material as a packaging material and the corresponding critical factors
- the way in which the most important characteristics relate to each other
- the hierarchy and dimensions of environmental aspects that are of importance
- an indication of the costs of the packages
- the construction of the packages

Have knowledge of:

- the processing of raw material to semimanufacture and end product; the manufacturing process
- the construction
- the characteristics/behaviour of packaging materials in connection with packaging applications and processes
- types and sorts of packaging materials
- requirements for each packaging type
- converting processes and surface treatments
- labelling, printing, and coding
- welding, sealing, and gluing
- measurements and closures
- incoming material control, quality aspects, tolerances, and specifications
- the most common defects – critical points
- environmental aspects

Have the skills to:

- indicate how material characteristics can be influenced
- indicate which material characteristics are important for which applications
- explain the connection between composition and characteristics
- understand that certain shapes have limitations
- indicate the critical points in the package

Demonstrate:

- attentiveness to using each individual material in connection with the characteristics of the material
- attentiveness to trends and developments in the application of each individual material in packaging
- a critical attitude towards the choice of the packaging type

### Glass

- have insight into the new developments in the use of glass for packaging
- have knowledge of hot end and cold end coating
- have the skills to classify defects

### Cardboard

- have insight into the raw materials and additives that have a strong influence on the price and characteristics of the material
- have knowledge of the characteristics (stiffness, modulus, layflatness, compression, etc.)
- have knowledge of the distribution properties



### **Plastics**

- have knowledge of the chemical composition of various plastics
- have knowledge of the characteristics (e.g. density, MWD, E-modulus, and tensile strength) of various plastics and the possibilities of influencing these
- have knowledge of plastic film: the manufacturing technology and application of film extrusion, calendaring, blown film extrusion, stretching, shrink film, and bubble wrap
- have knowledge of mechanical and thermic characteristics of plastic film and rigid plastic
- have knowledge of rigid plastics: the technology and application of extrusion, extrusion bottles, injection moulding, injection blow-moulding, injection blowing, stretch blow moulding, biaxial blowing, rotation moulding, foaming, thermoforming
- have the skills to deduce the production technology of a sample of rigid plastic packaging

### **Biopolymers**

- have insight into the state of the art and be able to apply biopolymers in packaging
- have insight into the conditions that need to be fulfilled before packaging based on biopolymers can be used
- have knowledge of the types of biopolymers and the corresponding characteristics
- have knowledge of the possibilities and limitations of biopolymers for packaging
- have knowledge of the environmental aspects, consumer acceptance, and legislation
- demonstrate a critical attitude when following the developments of the application of biopolymers in packaging

### **Metal**

- have knowledge of the processing and surface coatings
- have knowledge of the types of cans
- have knowledge of the production of 2-piece and 3-piece cans: DRD, DTR, DWI, and EOE-SOT.
- have knowledge of the behaviour on the packaging line
- have knowledge of the general principles of preservation

### 3. Technologies

#### **In general**

Have insight into:

- the various packaging systems
- the bottlenecks that influence the output
- the methods for increasing the output of a packaging line
- the way to evaluate investment decisions concerning output

Have knowledge of:

- components of a packaging line
- the general principals of mechanisation
- the methods for dosing and weighing
- the methods and operational principles of machines for forming, filling, and sealing
- the various packaging systems
- labelling and coding systems
- wrapping, bundling, strapping, and palletising machines
- the bottlenecks that influence the output of a packaging line
- the influence of human, machine (maintenance), material, and technology factors on the output of a packaging line

Have the skills to:

- indicate when automated and when mechanised packaging is useful
- indicate methods to increase the output of a packaging line

Demonstrate:

- an attentive attitude towards improvement possibilities of packaging lines

#### **Modified Atmosphere, gas, and active packaging**

Have insight into:

- the applications of Modified Atmosphere, gas, and active packaging
- a multidisciplinary approach to designing and developing these types of packaging

Have knowledge of:

- the concepts and technologies of and the distinctions between and among Modified Atmosphere, gas, and active packaging
- the technical and non-technical aspects of Modified Atmosphere, gas, and active packaging

Have the skills to:

- develop a strategy for the development of a packaging system
- indicate which types of products are most suitable for which types of packaging

Demonstrate:

- attentiveness to new developments in the fields of Modified Atmosphere, gas, and active packaging and the corresponding technology

#### **Printing technology**

Have insight into:

- the possibilities of printing packaging materials and packages and the corresponding critical factors
- the hierarchy and dimensions of environmental aspects that are of importance with regard to printing technologies
- the developments in the various printing technologies

Have knowledge of:

- the printing technologies: relief printing, offset printing, gravure printing, screen printing, and digital printing
- the criteria, guidelines, and considerations for the choice of a printing technology
- environmental aspects, types of ink, prepress, and printing quality

Have the skills to:

- recognise printing technologies on packages, judge prints, and indicate critical points

Demonstrate:

- attentiveness to trends and developments in packaging printing
- a critical attitude towards the choice of printing technology

## 4. Packaging processes and products

### Processes

Have insight into:

- the complexity and dependence of common market-product-packaging combinations and the packaging process
- the structure of tools in the creation process of a market-product-packaging combination
- putting together a packaging line based on a number of structural diagrams

Have knowledge of:

- the variables in packaging processes
- packaging machines, methods, or systems for the different types of processing of products and their state of aggregation (solid, liquid, semiliquid, granular, or powdery)
- the possible stages in the production process of a packaging line
- the various ways of filling and the various methods to bring the packaging, the product, and the packaging parts together (continuous, intermitting, inline, rotating)

Have the skills to:

- translate product requirements to packaging processes (way of preservation, conditions, etc.)
- indicate the structure of packaging processes
- indicate the arrangement of packaging machines, methods, or systems for the various types of processing of products and their state of aggregation (solid, liquid, semiliquid, granular, or powdery)
- describe the options for filling in a packaging line based on the set requirements

Demonstrate:

- an attentive attitude towards new developments
- attentiveness towards the construction of packaging lines and the corresponding characteristics and features

### Products

Products can be divided into these categories: solid/pasty food products, liquid food products, pharmaceutical products, dangerous goods, and industrial products. The phrasing of the question will often be based on a specific product from one of these categories.

Have insight into:

- the complexity of packaging processes
- the field of activities and the content of the most important legislation for packaging specific products
- the most important bottlenecks for packaging specific products



Have knowledge of:

- the most important legislation in connection with the product that needs to be packed (or the product category)
- the most important components of the packaging lines in connection with the product that needs to be packed (or the product category)

Have the skills to:

- formulate the requirements for a packaging system for a certain market-product-packaging combination
- understand the bottlenecks of the packaging line of specific products
- broaden and sharpen perceptivity with regard to packaging processes

Demonstrate:

- the ability to evaluate the process in order to find possibilities for improvement based on his/her own knowledge, vision, and experience



## 5. General skills

### Communication

Have insight into:

- the importance of good communication
- the role of communication in a multidisciplinary profession such as packaging
- improving the personal presentation
- the position of packaging in the organisation and the consequences of this for his/her functioning

Have knowledge of:

- the way communication processes work
- the essential stages of communication processes and the possibilities of influencing them

Have the skills to:

- utilise communication in a functional way
- identify patterns in group processes
- deduce his/her own influence on communication processes
- be convincing in attitude and behaviour

Demonstrate:

- a positive attitude towards group bonding
- willingness to work together in small and large groups in projects and amassing knowledge

## 6. Additional information

The Examination Requirement NVC Packaging Professional II are based on the Competence Profile Packaging Manager. The Competence Profile Packaging Manager can be obtained from Stichting NVC Examens, PO Box 164, 2800 AD, Gouda, the Netherlands.

The regulation and appeals procedure for the exams NVC Packaging Manager are given in the Regulation and Appeals Procedure NVC Packaging Professional. Stichting NVC Examens is under supervision of Stichting Examenkamer, PO Box 3439, 7301 EK Apeldoorn, the Netherlands.