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Ergonomics approved quality label

CVP 500 NEOPOST

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Client
NEOPOST

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721-01

1 Introduction

This is a test report that contains a vhp human performance Ergonomics approved quality label concerning the NEOPOST CVP 500 fit-to-size parcel creator. vhp human performance grants an ergonomics approved quality label that certifies that the NEOPOST CVP 500 fit-to-size parcel creator from serial number series starting with 17FZ meets appropriate standards concerning ergonomics and human factors (see 6 Appendix on standards) as long as the instructions are applied (see 5 Instructions for use).

The Ergonomics approved quality label has been granted for a period of 5 years (10-10-2016 up to 10-10-2021 by a Eur.Erg., a certified European ergonomist, who has deep knowledge of principles of ergonomics and relevant human characteristics concerning anatomy, physiology, psychology, social organization and on how the physical environment affects workers. This qualification certifies knowledge in human performance/LEAN strategies, statistics, design, equipment and ergonomic well designed equipment. The Eur.Erg. code of conduct is applicable. For more information on Eur.Erg. certified European ergonomists and the code of conduct go to https://www.eurerg.eu/

Important notes:
Note 1: This Ergonomics approved quality label concerns ergonomics and human factors issues and does not concern safety and material related issues.

Note 2: This quality label is not by any means a CE marking as this is specified in the DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 May 2006 on machinery and amending Directive 95/16/EC (CE marking). CE marking is provided by Neopost Technologies b.v.
Note 3: This Ergonomics approved quality label concerns the operator working station and operator manual handling and does not concern working in or at the machine itself (i.e. cleaning and maintenance activities are not included).

2 Product: NEOPOST CVP 500 fit-to-size parcel creator

The CVP-500 fit-to-size parcel creator produces a perfect parcel for each specific order. It can create, fill, fold and label each parcel in a different optimized size in one seamless process. The CVP-500 is an innovative solution that creates significant benefits for the operating company, the carrier and the end customer. Due to its automated fit-to-size and parcel design capability, the CVP-500 offers the following key business benefits:

- Boosts productivity: the CVP-500 is up to 10 times faster than manual packaging;
- Reduces shipping volume per box by up to 50%, by eliminating unnecessary volume and reducing shipping costs;
- Saves up to 20% of cardboard;
- Eliminates filler materials with tailor-made parcels;
- Environmental benefits are significant due to less use of corrugated cardboard and by avoiding unnecessary transport volume.

3 Relevant ergonomic/human factors features and characteristics

The NEOPOST CVP 500 operator working station has been tested taking into account the following ergonomic/human factors features and characteristics:

- Back load: the back load has been tested according to the NIOSH back load standard[1] using the 3D Static Strength Prediction Program™ Version 7.0.0 – 2016 developed by The Center for Ergonomics at the University of Michigan College of Engineering [2] using the frequency correction tables developed by Snook and Ciriello[3];
- Reaching/reach envelope/working postures (ankle-knee-hips-torso/back-neck-shoulders-elbow-wrist): This has been tested while using the Standard NEN-EN 1005-4:2005+A1:2008 en: Safety of machinery - Human physical performance - Part 4: Evaluation of working postures and movements in relation to machinery;

[1] Ergonomics, 1993, Volume 36 –Issue 7 page 749-776; Revised NIOSH equation for the design and evaluation of manual lifting tasks; THOMAS R. WATERS et al, National Institute for Occupational Safety and Health (NIOSH), 4676 Columbia Parkway, Cincinnati, OH, 45226, USA

[2] http://c4e.engin.umich.edu/tools-services/3dsspp-software/

[3] Snook, S. H. and Ciriello, V. M., The design of manual handling tasks: revised tables of maximum acceptable weights and forces, *Ergonomics* , 34, 9, 1991

- Repetitive handling at high frequency: This has been tested while using the Standard NEN-EN 1005-5:2007 Safety of machinery - Human physical performance - Part 5: Risk assessment for repetitive handling at high frequency;
- Force limits: These have been tested while using the Standard NEN-EN 1005-3:2002+A1:2008Safety of machinery - Human physical performance - Part 3: Recommended force limits for machinery operation and the standard NEN-ISO 11228-2:2007 en Ergonomics - Manual handling - Part 2: Pushing and pulling;
- General specifications and Ergonomic Guidelines for Manual Materials Handling[4] issued by a consortium of OSHA, CAN, EASE, NIOSH, DIR and CNC Workplace Safety and Health have been taken into account while testing.

[4] http://www.cdc.gov/niosh/docs/2007-131/pdfs/2007-131.pdf

Important notes:
Note 4: In the USA OSHA applies the OSH Act's General Duty Clause under which employers must keep their workplaces free from recognized serious hazards, including ergonomic hazards. As an adjunct to the Site Specific Targeting (SST), OSHA annually notifies employers in the OSHA Data Initiative who report high Lost Workday Injury and Illness rates at their establishment(s) and recommends that they seek assistance in addressing these workplace hazards. If employers report high rates of injuries which in some cases may be related to ergonomic issues, they will also be urged to seek assistance to address those hazards. Note that these type of OSHA action may occur during the five year period the vhp human performance Ergonomics approved quality label has been granted.
Note 5: OSHA 29 CFR 1910 Subpart O (OSHA Regulation) is a safety based regulation and is not included in the applied ergonomics testing.
Note 6: NEOPOST supplies a NEOPOST CVP 500 fit-to-size parcel creator only. It is the buyers responsibility to integrate the machine correctly into its logistic system. NEOPOST advises it's clients to take into account both the B11.TR 1-2004, Ergonomic Guidelines for the Design, Installation And Use of Machine Tools[5] as well as the manual issued by Packaging Machinery Manufacturers which is available through: http://www.pmmi.org/files/uploads/ergonomicsmanual.pdf .
Note 7: In the USA the State of California uses it's own state specific regulations. These regulations can be found in the Cal/OSHA Article 106 Ergonomics (sections 5110 - 5120). The regulations focus on prevention of RMI's (repetitive motion injuries). Testing on the basis of Cal/OSHA Article 106 regulations is not included and has to be performed by the buyer.
Note 8: All standards have been applied taking into account a max working day of 8 hours including in total of 45 minutes in breaks consisting of one 30 min break and one 15 min break.
Note 9; Manually lifting should be prevented as much as possible at all times. Vertically manually lifting should be replaced by shoving of goods in a horizontal plane as much as possible. System integration is advised in order to avoid vertically manually lifting of goods.

4 General workstation specifications

The CVP-500 operator workstation consists of a construction to support a working surface on which the items are placed and transferred into the machine in order to create a parcel. The working surface is partly fixed and partially a conveyer belt. A construction behind the working surface supports the placement and transfer of items in the machine.

As the placement and transfer of items on the working surface is the most physically demanding action in the operation of the machine, the height of the workplace surface is a very important specification of the machine. Another important specification is the distance between the standing position of the operator and the area of the item supply. To prevent the operator from reaching too far the supply of items to the operator must preferably be placed as close as possible and on a similar height as the working surface.

Below, these two important specifications of the workstation are further explained.

[5] Which can be obtained through: http://www.asse.org/ansi-b11-tr1-2004-ergonomic-guidelines-for-the-design-installation-and-use-of-machine-tools/

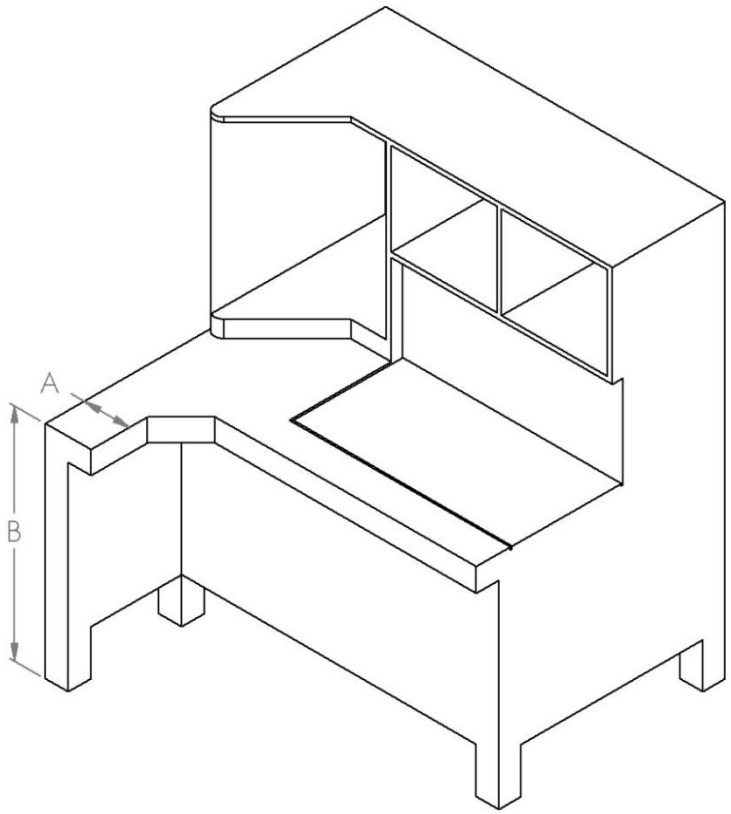

Figure 1 – General layout of the CVP500 workstation with two important dimensions noted (A: width of working surface near supply, B: working surface height

Working surface height

The desired working surface height depends on the expected operator population. Due to the expected physical activity at the workstation, the working surface height should be 12cm below the elbow height of the operator. In the table below, three types of populations are shown, with their corresponding stature height, elbow height and desired working surface height.

Population	P50 stature height [cm]	P50 elbow height [cm]	Working surface height (with shoes)
NL 2004 - M/F - 20-60jr	174	108	96
North American - M/F	172	107	95
China	159	99	89

Table 1 - Stature and elbow height for different populations

Reaching envelope at item supply

The items for transfer into the machine are supplied on the left side of the operator. As the item supply is not part of the machine the exact type and placement of item supply is not specified. However, the design of the item supply can have a big impact on the ergonomics and physical load of the operator. The CVP-

500 is designed such that it is possible to supply items very close to the standing position of the operator. The width of the working surface on the supply side (dimension A in Figure 1) is 30 cm in order to minimize the required reaching of the operator. For optimal ergonomics during the placement of items on the workstation, the item supply should be placed on the same height as the working surface.

Leg, knee and foot space
Sufficient leg, knee and foot space prevents operators from (over)reaching and thus prevents back load.

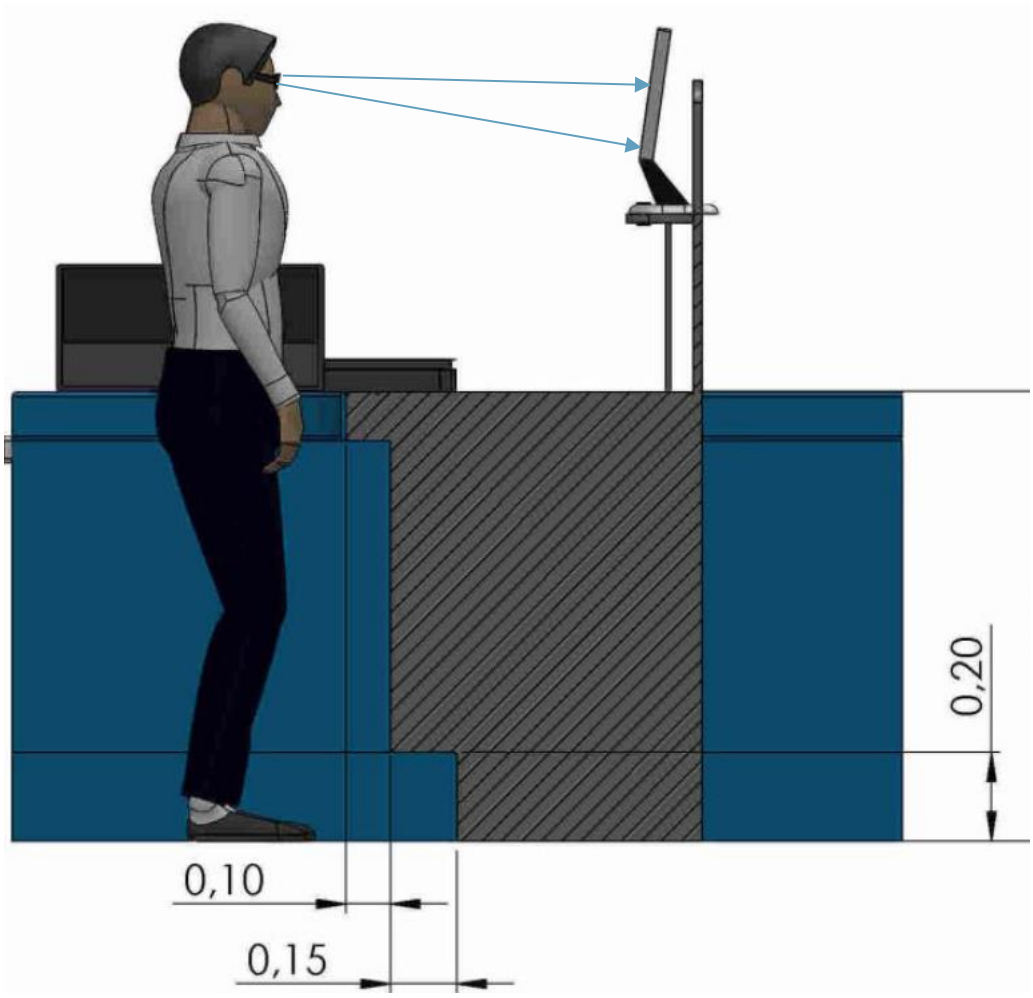

Figure 2 – Knee and foot space of the CVP500 workstation. Knee space= 10 cm. Foot space= 10+15 cm=25 cm, free height of foot space is 20 cm.

Operator screen field of vision
In order to prevent neck load the centre of the visual part of the screen should be placed at eye height of the operator.

Population	P5 eye height [cm]	P50 eye height [cm]	P95 eye height [cm]
NL 2004 - M/F - 20-60jr	149	165	182
North American - M/F	131	155	179
China	136	149	162

Table 2- Preferred eye height of the centre of the screen (Neopost CVP centre of screen vision is placed at 165 cm)

5 Ergonomic approved label

vhp human performance grants an ergonomics approved quality label that certifies that the NEOPOST CVP 500 fit-to-size parcel creator from serial number starting with 17FZ meets appropriate standards concerning ergonomics and human factors as long as the specified workplace specifications are applied (see 4 Workplace Specifications).

The Ergonomics approved quality label has been granted for a period of 5 years (10-10-2016 up to 10-10-2021) by a Eur.Erg., a certified European ergonomist. The Eur.Erg. code of conduct is applicable. For more information on Eur.Erg. certified European ergonomists and the code of conduct go to https://www.eurerg.eu/ .

6 Appendix on applied standards

Standard	Dutch	English	Description	Status
NEN-EN 614-1:2006+A1:2009 en	Veiligheid van machines - Ergonomische ontwerpprincipes - Deel 1: Terminologie en algemene principes	Safety of machinery - Ergonomic design principles - Part 1: Terminology and general principles	This European Standard establishes the ergonomic principles to be followed during the process of design of machinery. This European Standard applies to the interactions between operators and machinery when installing, operating, adjusting, maintaining, cleaning, dismantling, repairing or transporting equipment, and outlines the principles to be followed in taking the health, safety and well-being of the operator into account.	Tested and approved
NEN-EN 614-2:2000+A1:2008 en	Veiligheid van machines - Ergonomische ontwerpprincipes - Deel 2: Interactie tussen het ontwerp van machines en werktaken	Safety of machinery - Ergonomic design principles - Part 2: Interactions between the design of machinery and work tasks	This European Standard establishes the ergonomics principles and procedures to be followed during the design process of machinery and operator work tasks. This European Standard deals specifically with task design in the context of machinery design, but the principles and methods may also be applied to job design.	Not applicable, withdrawn in 2008
NEN-EN 894-1:1997+A1:2008 en	Veiligheid van machines - Ergonomische eisen voor het ontwerpen van informatie- en bedieningsmiddelen - Deel 1: Algemene beginselen voor de interactie tussen de mens en informatie- en bedieningsmiddelen	Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 1: General principles for human interactions with displays and control actuators	This European Standard applies to the design of displays and control actuators on machinery. It specifies general principles for human interaction with displays and control actuators, to minimise operator errors and to ensure an efficient interaction between the operator and the equipment. It is particularly important to observe these principles when an operator error may lead to injury or damage to health.	Not applied on safety issues. Applied and approved on ergonomic issues
NEN-EN 894-2:1997+A1:2008 en	Veiligheid van machines - Ergonomische eisen voor het ontwerpen van informatie- en bedieningsmiddelen - Deel 2: Informatiemiddelen	Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 2: Displays	This European Standard gives guidance on the selection, design and location of displays to avoid potential ergonomic hazards associated with their use. It specifies ergonomics requirements and covers visual, audible and tactile displays. It applies to displays used in machinery (e.g. devices and installations, control panels, operating and monitoring consoles) for occupational and private use.	Not applied on safety issues. Applied and approved on ergonomic issues

Standard	Dutch	English	Description	Status
NEN-EN 894-3:2000+A1:2008 en	Veiligheid van machines - Ergonomische eisen voor het ontwerpen van informatie- en bedieningsmiddelen - Deel 3: Bedieningsmiddelen	Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 3: Control actuators	This European Standard gives guidance on the selection, design and location of control actuators so that they are adapted to the requirements of the operators, are suitable for the control task in question and take account of the circumstances of their use. It applies to manual control actuators used in equipment for occupational and private use. It is particularly important to observe the recommendations in this European Standard where operating a control actuator may lead to injury or damage to health, either directly or as a result of a human error.	Not applied on safety issues. Applied and approved on ergonomic issues
NEN-EN 894-4:2010 en	Veiligheid van machines - Ergonomische eisen voor het ontwerpen van informatie- en bedieningsmiddelen - Deel 4: Locatie en indeling van informatie- en bedieningsmiddelen	Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 4: Location and arrangement of displays and control actuators	This European Standard contains ergonomic requirements for the location and arrangement of displays and control actuators in order to avoid hazards associated with their use. This European Standard applies to displays and control actuators for machinery and other interactive equipment (e.g. devices and installations, instrument panels, control and monitoring consoles).	Not applied on safety issues. Applied and approved on ergonomic issues
NEN-EN 1005-3:2002+A1:2008 en	Veiligheid van machines - Menselijke fysieke belasting - Deel 3: Aanbevolen maximale krachten bij machinewerkzaamheden	Safety of machinery - Human physical performance - Part 3: Recommended force limits for machinery operation	This European Standard presents guidance to the manufacturer of machinery or its component parts and the writer of C-standards in controlling health risks due to machine-related muscular force exertion. This standard specifies recommended force limits for actions during machinery operation including construction, transport and commissioning (assembly, installation, adjustment), use (operation, cleaning, fault finding, maintenance, setting, teaching or process changeover) decommissioning, disposal and dismantling.	Not applicable, withdrawn in 2008

Standard	Dutch	English	Description	Status
NEN-EN 1005-4:2005+A1:2008 en	Veiligheid van machines - Menselijke fysieke belasting - Deel 4: Evaluatie van werkhoudingen en bewegingen bij machinewerkzaamheden	Safety of machinery - Human physical performance - Part 4: Evaluation of working postures and movements in relation to machinery	This European Standard presents guidance when designing machinery or its component parts in assessing and affecting health risks due only to machine-related postures and movements, i.e. during assembly, installation, operation, adjustment, maintenance, cleaning, repair, transport, and dismantlement. This European Standard specifies requirements for postures and movements without any or with only minimal external force exertion. The requirements are intended to reduce the health risks for nearly all healthy adults.	Not applicable, withdrawn in 2008
NEN-EN 1005-5:2007 en	Veiligheid van machines - Menselijke fysieke belasting - Deel 5: Risicobeoordeling voor herhaalde handelingen met hoge frequentie	Safety of machinery - Human physical performance - Part 5: Risk assessment for repetitive handling at high frequency	This European standard establishes ergonomic recommendations for repetitive work tasks involving the manual handling of low loads at high frequency. It provides guidance on the identification and assessment of risk factors commonly associated with handling low loads at high frequency, thereby allowing evaluation of the related health risks to the working population.	Tested and approved
NEN-EN 1050:1997 replaced by NEN-ISO 12100:2010	Veiligheid van machines - Basisbegrippen voor ontwerp - Risicobeoordeling en risicoreductie	Safety of machinery - General principles for design - Risk assessment and risk reduction	NEN-ISO 12100:2010 specifies basic terminology, principles and a methodology for achieving safety in the design of machinery. It specifies principles of risk assessment and risk reduction to help designers in achieving this objective. These principles are based on knowledge and experience of the design, use, incidents, accidents and risks associated with machinery.	Not applied on safety issues. Applied and approved on ergonomic issues
NEN-ISO 1503:2008 en	Ruimtelijke oriëntatie en bewegingsrichting - Ergonomische eisen	Spatial orientation and direction of movement - Ergonomic requirements	This International Standard sets out design principles, procedures, requirements and recommendations for the spatial orientation and direction of movement of controls and displays used in tool machines, industrial robots, office machines, earth-moving machinery, transportation (automobiles, railway electric cars/rolling stock, aircraft, ships, etc.), information, daily commodities, public utilities and the operational components of building facilities.	Not applied on safety issues. Applied and approved on ergonomic issues

Standard	Dutch	English	Description	Status
NEN-EN-ISO 6385:2004 en	Ergonomische beginselen bij het ontwerpen van werksystemen	Ergonomic principles of the design of work systems	This International Standard establishes the fundamental principles of ergonomics as basic guidelines for the design of work systems and defines relevant basic terms. It describes an integrated approach to the design of work systems, where ergonomists will cooperate with others involved in the design, with attention to the human, the social and the technical requirements in a balanced manner during the design process.	Not applied on safety issues. Applied and approved on ergonomic issues
NEN-ISO 11226:2001/C1:2006 en	Ergonomie - Evaluatie van statische werkhoudingen	Ergonomics - Evaluation of static working postures	This International Standard establishes ergonomic recommendations for different work tasks. This standard provides information to those involved in design, or redesign, of work, jobs and products who are familiar with the basic concepts of ergonomics in general, and working postures in particular.	Tested and approved
NEN-ISO 11228-1:2003 en	Ergonomie - Handmatig verplaatsen van lasten - Tillen en dragen	Ergonomics - Manual handling - Part 1: Lifting and carrying	Specifies recommended limits for manual lifting and carrying while taking into account, respectively, the intensity, the frequency and the duration of the task. provides guidance on the assessment of several task variables, allowing the health risks for the working population to be evaluated. Applies to manual handling of objects with a mass of 3 kg or more.	Not applied, NIOSH standard has been used
NEN-ISO 11228-2:2007 en	Ergonomie - Handmatig verplaatsen van lasten - Duwen en trekken	Ergonomics - Manual handling - Part 2: Pushing and pulling	Gives the recommended limits for whole-body pushing and pulling. It provides guidance on the assessment of risk factors considered important to manual pushing and pulling, allowing the health risks for the working population to be evaluated.	Tested and approved
NEN-ISO 11228-3:2007-11 en	Ergonomie - Handmatig verplaatsen van lasten - Deel 3: Hoog frequent hanteren bij een lage belasting (corrected and reprinted/)	Ergonomics - Manual handling - Part 3: Handling of low loads at high frequency (corrected and reprinted|)	Establishes ergonomic recommendations for repetitive work tasks involving the manual handling of low loads at high frequency. It provides guidance on the identification and assessment of risk factors commonly associated with handling low loads at high frequency, thereby allowing evaluation of the related health risks to the working population.	Not applied, NEN ISO 1005-5 has been applied
NEN-EN 13861:2011 en	Veiligheid van machines - Leidraad voor de toepassing van ergonomie-normen bij	Safety of machinery - Guidance for the application of ergonomics	This European Standard provides a methodology to achieve a coherent application of various ergonomics standards for the design of machinery.	Adviced as guidance

Standard	Dutch	English	Description	Status
	het ontwerpen van machines	standards in the design of machinery	This standard presents a step model calling upon specific standards.	
NEN-EN-ISO 14738:2008 en	Veiligheid van machines - Antropometrische eisen voor het ontwerp van werkplekken bij machines	Safety of machinery - Anthropometric requirements for the design of workstations at machinery	Establishes principles for deriving dimensions from anthropometric measurements and applying them to the design of workstations at non-mobile machinery. It is based on current ergonomic knowledge and anthropometric measurements. This International Standard specifies the body's space requirements for equipment during normal operation in sitting and standing positions.	Adviced as guidance
American Standards				
OSHA 29 CFR 1910 Subpart O (OSHA Regulation)		Machinery and machine guarding.	Includes definitions, general requirements, and different kinds of machinery requirements.	Adviced as guidance
ANSI B11.TR1-2004 (Not an American National Standard)		Ergonomic Guidelines for the Design, Installation & Use of Machine Tools	The purpose of this guideline is to provide a uniform approach to ergonomic considerations for machine tools within the workplace. This document addresses those considerations which will assist in design, installation and use of manufacturing systems, including individual and integrated machine tools and auxiliary components.	Adviced as guidance
ISO 11226:2000		Ergonomics - Evaluation of static working postures	This International Standard establishes ergonomic recommendations for different work tasks. This standard provides information to those involved in design, or redesign, of work, jobs and products who are familiar with the basic concepts of ergonomics in general, and working postures in particular.	Tested and approved
ISO 11228-1:2003		Ergonomics - Manual handling - Part 1: Lifting and carrying	Specifies recommended limits for manual lifting and carrying while taking into account, respectively, the intensity, the frequency and the duration of the task. provides guidance on the assessment of several task variables, allowing the health risks for the working population to be evaluated. Applies to manual handling of objects with a mass of 3 kg or more.	Tested and approved

Standard	Dutch	English	Description	Status
ISO 11228-2:2007		Ergonomics - Manual handling - Part 2: Pushing and pulling	Gives the recommended limits for whole-body pushing and pulling. It provides guidance on the assessment of risk factors considered important to manual pushing and pulling, allowing the health risks for the working population to be evaluated.	Tested and approved
ISO 11228-3:2007		Ergonomics - Manual handling - Part 3: Handling of low loads at high frequency	Establishes ergonomic recommendations for repetitive work tasks involving the manual handling of low loads at high frequency. It provides guidance on the identification and assessment of risk factors commonly associated with handling low loads at high frequency, thereby allowing evaluation of the related health risks to the working population.	Not applied, NEN ISO 1005-5 has been applied
ISO 15534-3:2000		Ergonomic design for the safety of machinery - Part 3: Anthropometric data	This part of ISO 15534 specifies current requirements for human body measurements (anthropometric data) that are required by ISO 15534-1 and ISO 15534-2 for the calculation of access-opening dimensions as applied to machinery.	Adviced as guidance
Cal/OSHA Article 106. Ergonomics (sections 5110 - 5120)		5110 Repetitive Motion Injuries (RMI)	Regulation for the prevention of RMI's	Adviced as guidance
OHS act of 1970	General Duty Clause, Section 5(a)(1)		An employer is required to keep the workplace free from recognized serious hazards, including ergonomic hazards.	Adviced as guidance
PMMI ergonomics	A guide for packaging machine manufacturers, 2001		This document is designed to provide a general overview of ergonomic principles as applied to the design and installation of packaging machinery. The information presented here should not be construed to create either expressly or by implication any certification or guarantee that the use of these principles will necessarily reduce or eliminate ergonomic injuries.	Adviced as guidance