



TEST REPORT EN ISO 12100: 2010 Safety of Machinery - General principles for design / Risk Assessment and Risk reduction	
Report Ref. No	ZA/2020/B0012B
Name and address of the Applicant	Kingtec Technical Co.,Ltd. 300032 1F., No. 189, Xida Rd., East Dist., Hsinchu City 300, Taiwan (R.O.C.)
Name and address of the manufacturer	Kingtec Technical Co.,Ltd. 300032 1F., No. 189, Xida Rd., East Dist., Hsinchu City 300, Taiwan (R.O.C.)
Rating(s)	Input power:100~240VAC
Product Name	KINGSSEL 3D Printer
Model/type	K-4040
Series Model(s)	K-1818、K-2327、K-3030、K-5050
Test specification	EN ISO 12100:2010
Tested site	Kingtec Technical Co.,Ltd. 300032 1F., No. 189, Xida Rd., East Dist., Hsinchu City 300, Taiwan (R.O.C.)
Tested date	Nov 23, 2020
Compiled by: Bruce Chen Nov 24, 2020  _____ Signature	Reviewed by: Jason Lin Reviewer Nov 27, 2020  _____ Signature
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I. Declaration of Conformity**KINGTEC TECHNICAL CO., LTD.
EC DECLARATION OF CONFORMITY**

We **KINGTEC TECHNICAL CO., LTD.**

Rm. 5, 1F., No. 38, Lingyun St., North Dist., Hsinchu City 300, Taiwan (R.O.C.)

Declare that the product name: KINGSSSEL 3D Printer

- Model type :K-1818, K-2327, K-3030, K-4040, K-5050

conform with the essential safety requirements of the relevant European Directive:

- Machinery Directive 2006/42/EC
- Electromagnetic Compatibility Directive 2014/30/EU

Mounting and connecting instructions defined in catalogues and technical construction files must be respected by the user.

They are based on the following standards :

- EN ISO 12100: 2010 / Safety of Machinery - General principles for design / Risk Assessment and Risk reduction .
- EN 61000-6-2:2005 / Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
- EN 61000-6-4:2007/A1:2011 / Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments.

Authorized Signature : 徐子翔
Name : Hsu Tzu-Hsiang
Responsibility : Engineer
Date : 2020.12.7
Place : Taiwan



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II. General information

Safety of machinery — Risk assessment

This risk assessment is compiled for the purposes of CE European Directives relating to the supply and use of machinery and other work equipment. It is intended to form part of a technical file to be retained for at least 10 years at the disposal of the regulatory body. As such, together with the instructions and other data, it provides evidence of due diligence on the part of the equipment supplier or user in ensuring the safety of persons using or operating the equipment to which it refers.

The general principles useful in reaching the risk reduction objectives established in EN ISO 12100. These general principles are known as risk assessment by which the knowledge and experience of the design, use, incidents, accidents and harm related to machinery is brought together in order to assess the risks during all phases of the life of the machinery.

This International Standard EN ISO 12100 gives guidance on the information required to allow risk assessment to be carried out. Procedures are described for identifying hazards and estimating and evaluating risk. The purpose of this International Standard EN ISO 12100 is to provide guidance for decisions to be made on the safety of machinery and guidance on the type of documentation required to verify the risk assessment carried out. This International Standard EN ISO 12100 does not deal with damage to domestic animals, property or the environment.

Information

The following information has been used during the preparation of this risk assessment:

Manufacturer's experience in the design and construction of this type of machinery (years)	Over 10 years
The risk/hazards known by the manufacturer or according to hazard list of C type standard	Yes
There is a C-type transposed harmonised standard for the machinery	NO

Risk graph according to EN ISO 12100

Risk graph is a method to assess the risks, associated with machinery, which makes use of a risk graph. This method allows performing hazard identification, risk estimation, risk reduction and risk evaluation to obtain the aimed goal of risk reduction.

The risk assessment is done in two steps:

1. First a new machine or an existing machine is assessed, risk reduction means are decided and implemented;
2. Then a new risk assessment is made, taking into account the implemented risk reduction measures, including new risks that they may introduce, to verify that the risks have been reduced to the appropriate level; this phase is done iteratively, until appropriate level of risk has been achieved.

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This method can be used for a machine under development, construction or already installed. People, who design, maintain, use or are in charge of its safety can use this method after an appropriate training.

The risk graph for risk estimation, each hazardous situation is described, using the four hazardous conditions (hazard, hazardous situation, hazardous event, possible harm) as defined in EN ISO 12100. A risk index is then calculated using the risk graph given in following figure, based on the four following parameters, corresponding to the four elements of risk as defined in EN ISO 12100, each one having its particular limits:

II. Assessment method

- **Severity of the harm: S**

- ◆ S1 light injury (usually reversible; examples: scratch, laceration, bruise, light wound requiring first aid, etc.);
- ◆ S2 serious injury (usually irreversible, including fatality); examples: broken or torn-out or crushed member; fracture; serious injury with stitch, major musculoskeletal trouble (MST), fatality, etc.

- **Frequency and/or duration of exposure to hazard: F**

- ◆ F1 twice or less by work shift or less than 15 min cumulated exposure by work shift;
- ◆ F2 more than twice by work shift or more than 15 min cumulated exposure by work shift.

- **Probability of occurrence of the hazardous event: O**

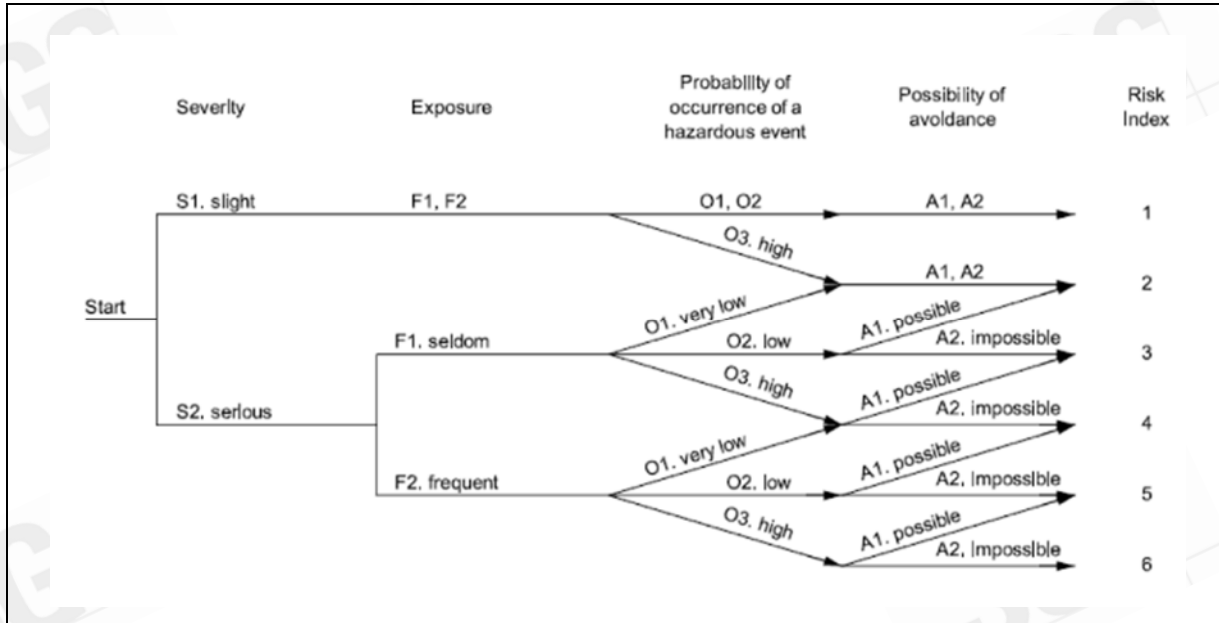
- ◆ O1 mature technology, proven and recognized in safety application; robustness;
- ◆ O2 - technical failure observed in the two last years;
 - inappropriate human action by a well-trained person, aware of the risks, with more than six months experience on the working station.
- ◆ O3 - technical failure regularly observed (every six months or less)
 - inappropriate human action by an untrained person, with less than six months experience on the working station.
 - similar accident observed in the plan since ten years

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● Possibility of avoidance or reduction of the harm: A

- ◆ A1 possible under some conditions:
 - If parts move at a speed less than $0,25 \text{ ms}^{-1}$
 - AND the exposed worker is familiar with the risks and with indications of its apparition;
 - depending of particular conditions (temperature, noise, ergonomic, etc.);
- ◆ A2 impossible.



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Risk assessment (hazard identification)					
Ref. No.	Hazard	Hazardous situation	Risk estimation (Initial risk)	Risk reduction / protective measures	Risk estimation (Risk reduction)
1.0	Mechanical hazards				
1.1	Crushing	The 3d printing nozzle moving may cause slightly the crushing danger.	S: 1, F: 1, O: 3 A: 2, Index: 2	1. Fix guard is used. 2. Safety Design according to according to EN ISO 12100. 3. Warning/ safety labels. 4. Safety instruction is provided in user manual. 5. Emergency stop device had been provided.	S: 1, F: 1, O: 1 A: 1, Index: 1
1.2	Shearing	The 3d printing nozzle moving may cause slightly the shearing danger.	S: 1, F: 1, O: 3 A: 2, Index: 2	1. Fix guard is used. 2. Safety Design according to according to EN ISO 12100 3. Warning/ safety labels. 4. Safety instruction is provided in user manual. 5. Emergency stop device had been provided.	S: 2, F: 1, O: 1 A: 1, Index: 1
1.3	Cutting/severing	The 3d printing nozzle moving may cause slightly the cutting danger.	S: 1, F: 1, O: 3 A: 2, Index: 2	1. Fix guard is used. 2. Safety Design according to according to EN ISO 12100 3. Warning/ safety labels. 4. Safety instruction is provided in user manual. 5. Emergency stop device had been provided.	S: 2, F: 1, O: 1 A: 1, Index: 1
1.4	Entanglement	N/A			
1.5	Drawing-in/trapping	N/A			
1.6	Impact	N/A			
1.7	Stabbing/puncture	N/A			
1.8	Friction/abrasion	N/A			
1.9	Slipping/tripping/falling	N/A			
1.10	Being run over/throw	N/A			
1.11	Suffocation	N/A			
1.12	High pressure fluid injection	N/A			
1.13	Ejection of parts	N/A			
1.14	Loss of stability	N/A			
2.0	Electrical hazards				
2.1	Shock/burn-direct/indirect contact	1. Direct/indirect contact with	S: 2, F: 1, O: 2, A: 2,	1. Well-ried components are used.	S: 2, F: 1, O: 1, A: 1,

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Risk assessment (hazard identification)					
Ref. No.	Hazard	Hazardous situation	Risk estimation (Initial risk)	Risk reduction / protective measures	Risk estimation (Risk reduction)
		live parts in failure of insulation or grounding and in maintenance. 2. Electrocution due to approach to live part. 3. Under fault conditions parts become live.	Index: 3	2. Proper warning signs are provided. 3. Proper warning signs and illustrations are provided in user manual.	Index: 2
2.2	Electromagnetic phenomenon-effects	N/A			
2.3	Falling, being thrown	N/A			
2.4	fire	N/A			
2.5	Projection of molten particle	N/A			
2.6	Thermal radiation	N/A			
3.0	Thermal hazards				
3.1	Burn or scald	The heater on 3d printing nozzle may cause a risk of burns during the operation of machine.	S: 2, F: 1, O: 3, A: 1, Index: 3	1. Fixed guard is used. 2. Proper warning signs and illustrations are provided in user manual. 3. Recommended operating methods are indicated in user instructions.	S: 2, F: 1, O: 1, A: 1, Index: 2
3.2	Dehydration	N/A			
3.3	Discomfort	N/A			
3.4	Frostbite	N/A			
3.5	Injury by the heat radiation	N/A			
4.0	Noise				
4.1	Discomfort- tinnitus, tiredness	N/A			
4.2	Loss of awareness, balance, hearing	N/A			
4.3	Indirect injury- interference with speech communication or with acoustic signal	N/A			

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Risk assessment (hazard identification)					
Ref. No.	Hazard	Hazardous situation	Risk estimation (Initial risk)	Risk reduction / protective measures	Risk estimation (Risk reduction)
5.0	Vibration				
5.1	Discomfort	N/A			
5.2	Low-back morbidity	N/A			
5.3	Neurological disorder	N/A			
5.4	Osteo-articular disorder	N/A			
5.5	Trauma of spine	N/A			
5.6	Vascular disorder	N/A			
6.0	Radiation				
6.1	Low/high frequency, radio frequency radiation, microwaves	N/A			
6.2	Infrared, visible and ultraviolet light	N/A			
6.3	X and gamma rays	N/A			
6.4	Alpha, beta rays, Electron or ion beams, neutrons	N/A			
6.5	Lasers	N/A			
7.0	Material/substance				
7.1	Contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	N/A			
7.2	Biological and microbiological	Using the wrong way to clean the machine will cause damage to the machine	S: 1, F: 2, O: 3 A: 2, Index: 2	1. Read the user instructions before operation. 2. Cleaning and disinfecting are indicated in user instructions. 3. Appropriated periods of cleaning and disinfecting are recommended.	S: 1, F: 2, O: 1 A: 2, Index: 1
7.3	Explosion/ Fire-combustible and flammable	N/A			
7.4	Poisoning-corrosive material, aerosol, toxic gas/fluid/ fume/mist, oxidizer	N/A			
7.5	Sensitization-fiber	N/A			
8.0	Ergonomic				

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Risk assessment (hazard identification)					
Ref. No.	Hazard	Hazardous situation	Risk estimation (Initial risk)	Risk reduction / protective measures	Risk estimation (Risk reduction)
8.1	Discomfort-unhealthy posture or excessive efforts.	Using bad posture to operate the machine.	S: 1, F: 2, O: 3 A: 2, Index: 2	1. Read the instructions before operation. 2. Take a rest after operation. 3. Take a safety transfer device or under 2 persons operation.	S: 1, F: 1, O: 2, A: 1, Index: 1
8.2	Visibility-inadequate local lighting	Operating the machine with insufficient local lighting.	S: 1, F: 2, O: 3, A: 2, Index: 2	1. Use appropriate light. 2. Read the instructions before operation. 3. Appropriate warning signs are visible clearly on automatic labeling machine and also indicate on the user manual.	S: 1, F: 1, O: 2, A: 1, Index: 1
8.3	Mental overload or underload, stress etc.	N/A			
8.4	Inadequate design or location or identification of manual controls	Confusing and other human error.	S: 1, F: 2, O: 3, A: 2, Index: 2	1. Read the instructions before operation. 2. Proper warning signs and illustration are provided in user manual and easily understand for operator.	S: 1, F: 1, O: 2, A: 1, Index: 1
8.5	Inadequate design or location of visual display units	N/A			
8.6	Repetitive activity, posture	N/A			
8.7	Flicker, dazing, shadow, stroboscopic	N/A			
9.0	Associated with environment				
9.1	Lack of oxygen	N/A			
9.2	Slipping	N/A			
9.3	Disease	N/A			
9.4	Any other as a consequence of the effect caused by the sources of hazards of the machine or parts of the machine	N/A			
10.0	Combination	N/A			

-End Report -

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