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## RISK ASSESSMENT

*Remark: This risk assessment meets the regulations of machine directive 2006/42/EC, which is transposed into national legislation through product safety law and its 9th provision. The risk assessment is carried out in agreement with the harmonised standard EN 12100:2010 and employs the "Hazard Rating Number" system (HRN) as a method of evaluation. A description of the system accompanies this document.*

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## 1. Details about documents

### a) Risk assessment document

<b>Project data:</b>	
Machine/ System name:	Akash Pack
Document name:	Risk Assessment Report
Document number:	SIPL_RBS_001_19112019
Version:	1
Performed by:	S. Balraju FS Eng (TÜV Rheinland, #19151/ 19, Machinery)
Date:	19 Nov 2019

<b>Version check</b>	
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<b>Submission</b>	
Submitted on:	
Responsible for submission:	S Balraju
Responsible from customer:	Ashok Atri

Received: First name, surname	
(Name, signature and stamp)	

## 2. Introduction

Carrying out a risk assessment with the aim of achieving EC conformity is not viewed as a finalisation of the machine's construction phase. Instead, it is much more part of an ongoing improvement process.

From customer feedback, active market observation and, unfortunately, also the number of accidents reported, elements of the safety concept or individual safety functions are revised and, in these cases, the risk assessment adapted or enhanced.

With this document, we are presenting you with the risk assessment of your machine / system. It is the responsibility of your company to keep this up-to-date at all times throughout the various life cycles of the machine / system. As a result, this document can and should also be used to be able to assess newly identified risks of the machine / system or enhance the existing assessment - and introduce and execute relevant measures to minimise the risk.

New or different hazard areas as well as any additional descriptions (limitations of the machine, functional descriptions, etc.) must then be added to this document and / or the operating instructions of the machine.

## 3. Risk Assessment

The EN ISO 12100:2010 standard indicates that the risk assessment represents a series of logical steps which, in a systematic way, make it possible to evaluate the risks posed through operation of the machine. Accompanying the risk assessment of the machine is risk reduction, if required, which is described in EN ISO 12100:2010 and EN ISO 13849-1:2008 or EN IEC 62061:2005. This process is repeated continually until the risk has been sufficiently eliminated / minimised and documented.

## 4. Limits and Designated use

Risk Assessment begins with the determination of the limits of the machinery, considering all the phases of the machinery life. This means that the characteristics and performances of the machine or a series of machines in an integrated process, and the related people, environment and products, should be identified in terms of the limits of machinery as given below,

1. Operating limits (I) and Designated Use Limit
2. Space Limitations
3. Time-related limitations
4. Other limits

## 5. Identification of hazard areas

To identify any hazards associated with the machines, a preliminary hazard analysis (PHA) is performed. The probability of an accident occurring is determined through this analysis. Furthermore, the severity of potential injuries or possible damage is assessed quantitatively. Thereafter, the proposed safety measures and results of risk reduction are presented.

## 6. Estimation of Risk

In this risk assessment, an estimation of the risk is carried out via the HRN system (Hazard Rating Number) for each hazard area identified.

The HRN method assesses the consequences of a certain event depending on the damage that persons could be exposed to. Four variables (PE, FE, MPL and NP) are defined for this purpose, which range according to the following scale:

- **PE** Probability of encounter - human and hazard  
(Value between 0.1 = not possible and 15 = definite)
- **FE** Frequency of person being exposed to hazard  
(Value between 1 = infrequent and 5 = permanent)
- **MPL** Maximum probability of injury or damage  
(Value between 0.1 = scratch and 15 = fatality)
- **NP** Number of persons exposed to risk  
(Value between 1 = 1 or 2 persons and 12 = 50 persons or more)

$$\text{HRN} = [\text{PE}] \bullet [\text{FE}] \bullet [\text{MPL}] \bullet [\text{NP}]$$

## 7. Risk assessment for each hazard area

With the formula applied in the previous section, the four factors can produce values of 0.01 to more than 10,000. These values form the numerical risk index, otherwise known as “Hazard Rating Number” or HRN. The HRN value for each hazard is arranged into four different number ranges, from “permissible, very low” to “too high, prohibited”. This subdivision is represented in below table .

HRN	Assessment	Risk Level
<b>HRN ≤ 10</b>	<b>Permissible, very low</b>	<b>Low Risk</b>
<b>10 &lt; HRN ≤ 50</b>	<b>Low, but significant</b>	<b>Medium Risk</b>
<b>50 &lt; HRN ≤ 500</b>	<b>High, considerable</b>	<b>High Risk</b>
<b>500 ≤ HRN</b>	<b>Too high, prohibited</b>	<b>Too high, Activity prohibited</b>

The following deals in more detail with assessment of the four levels of risk and the corresponding safety measures that need to be implemented:

- **Permissible, very low:** Seen as a very low risk, which is why the proposed safety measures (if present) are optional. It is recommended to inform the personnel in question of any potential residual risks.
- **Low, but significant:** The risk is low but safety measures are to be implemented and assessed in consideration of the technical and economic practicability as well as their planning. During the interim period leading up to proper implementation of the safety measures, it is recommended to inform the staff of the existing risks.
- **High, considerable:** Safety measures are urgently required. This includes those recommended in this risk assessment as well as others that equally mitigate the risk. Until the measures have

been implemented, it is recommended to inform all affected staff of the existing risks, provide training possibly or take the machine or system out of service as necessary.

- Too high, prohibited: Safety measures must be implemented immediately. The machine or system cannot be run or brought into operation without prior mitigation of the risk.

## PROJECT DATA

Machinery

SK Pack

Sub – Machine

Filling & Sealing Machine

### 1. Operating limits (I) and Designated Use Limit

Pouch is filled manually by two operators. Empty was taken manually by the operator & hold below the nozzle. Sensor sense the object in front & discharge the liquid. Pouch transfer to sealing station by conveyor. Operator hold the pouch in the sealing station & give the command by pressing the switch provided in the operator's foot.

### 2. Space Limitations :-

Refer Below Photo

### 3. Time-related limitations

Machine Manufacturing date & Manufacturers Service Life recommendations are not available on machine.

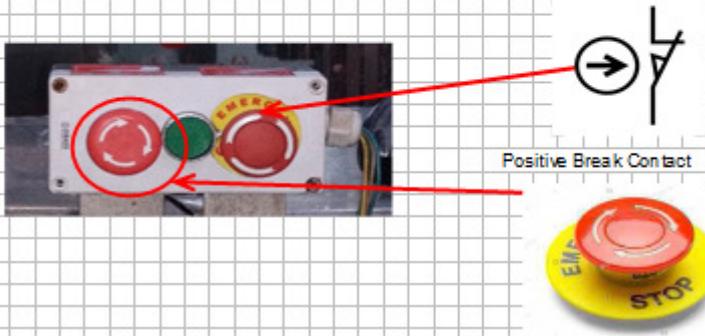
### 4. Customer Documents



**Details and assessment BEFORE control measures**

No.	Title of hazard	Location	Zone	Risk level (evaluation)
1	Emergency stop with non-safe contact	In front of the operator	Filling Station	High ●
2	Pinch point on Moving Part of conveyor	Left side of machine Operator	Filling Station	High ●
3	Liquid Spillage	Filling Station Sensor	Filling Station	Low but significant ●
4	Improper cable connection	Front side Filling Station	Filling Station	High ●
5	Access to Filling station	Bottom side of Conveyor	Filling Station	High ●
6	Access to the linear motion	Inside filling unit	Filling station	High ●
7	Improper routing of pneumatic pipe & cable	Bottom side	Filling Station	High ●
8	Dissipation of Pneumatic Air	Bottom Side	Filling Station	High ●
9	Improper Electric Switches	back side of the machine	Filling station	High ●
10	Electrical Panel	Back Side	Filling & Sealing Station	High ●
11	Pinch during pouch sealing	Front side	Sealing Station	High ●
12	Crushing of finger	Front side & Bottom side	Sealing Station	High ●

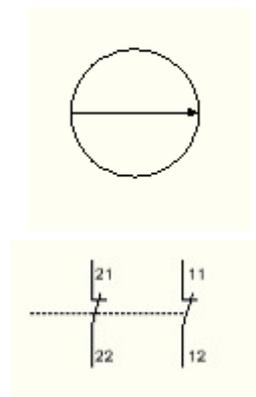
Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
1	Emergency stop with non-safe contact	'In front of the operator	'Filling Station	High	100

HAZARD No.: 1		TITLE OF HAZARD: Emergency stop with non-safe contact		Date: 19-11-2019					
Type of Hazard: 11.9 - Failure / poor design of the control system SRP/CS		Location: In front of the operator		Zone: Filling Station					
RISK ASSESSMENT OF THE CURRENT STATE		life phases: Production; Maintenance; Cleaning: -							
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN
Possible occurrence	5.0	Daily	2.5	Disease at long-term	8.0	1-2 persons	1.0	High	100.0
Comment: Emergency stop provided on the machine is having conventional contacts which are not safe.									
CONTROL MEASURES PROPOSED		 <p>Emergency Stop with positive break contact Emergency Stop to be used as per EN ISO 13850. NC contacts used in are to be Positive break contact to meet fail-safe design of emergency stop. Emergency stop need to have yellow background &amp; it should not be used as machine STOP. Upon actuation of emergency stop All energy sources should be isolated &amp; machine movements must be stop. Emergency stop to be wired with Safety relay as per EN ISO 13849-1</p>							
Normative basis:		EN ISO 12100, EN ISO 13850 EN ISO 13849-1		S	F	P	Cat.	PLr	
SRP/CS:		Emergency Stop to be used with Safety Relay/ Safety Controller		S2	F2	P1	3	d	

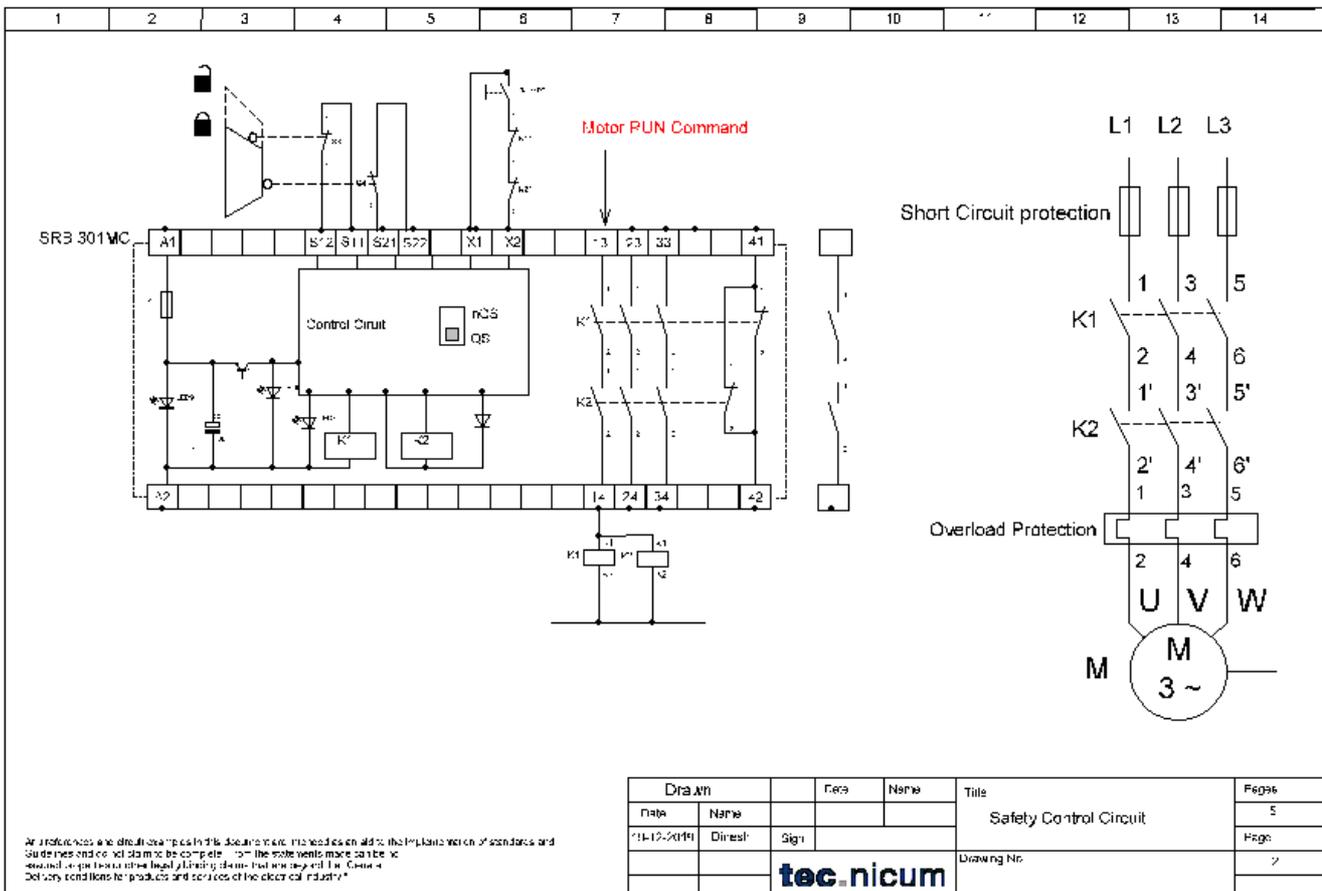
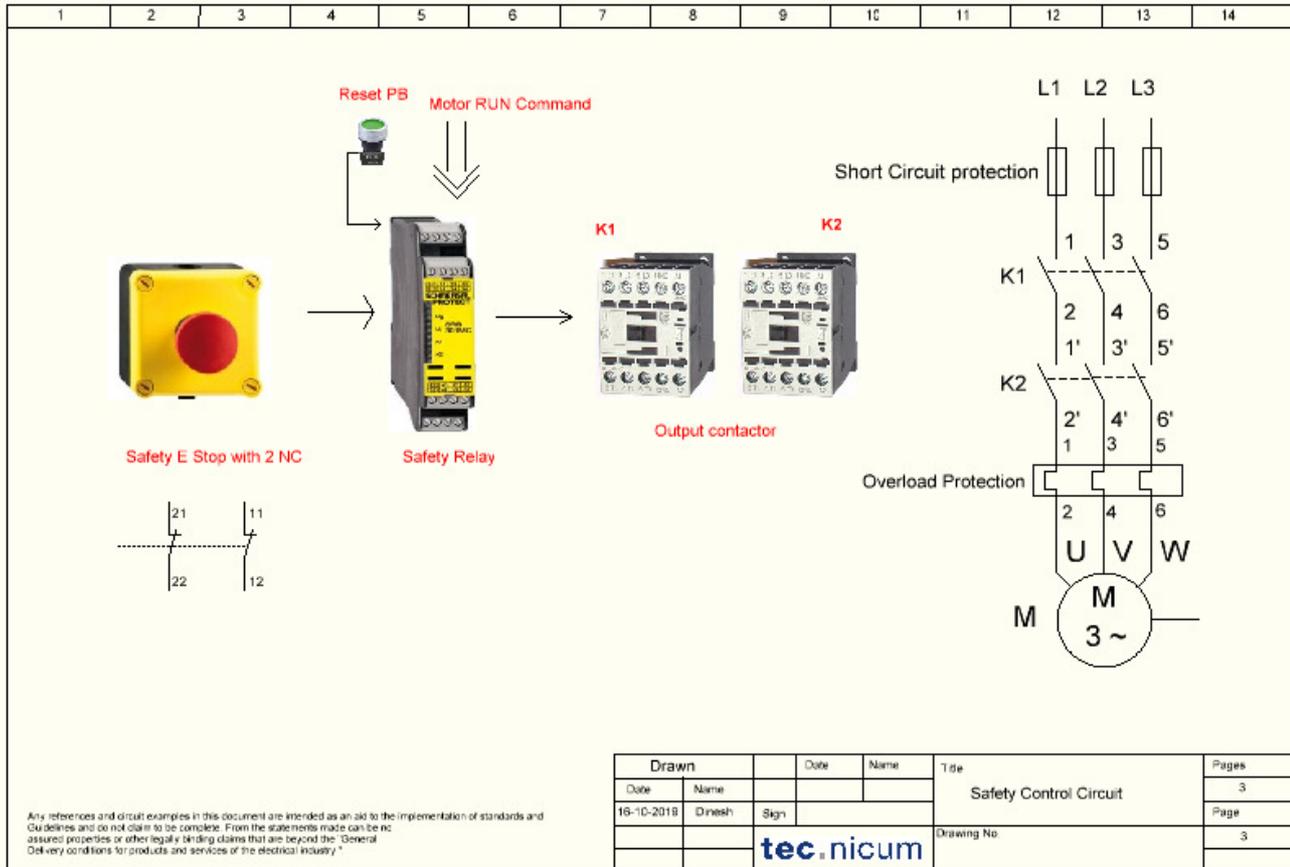
Photos Of Hazard



Safety Control Measure proposed

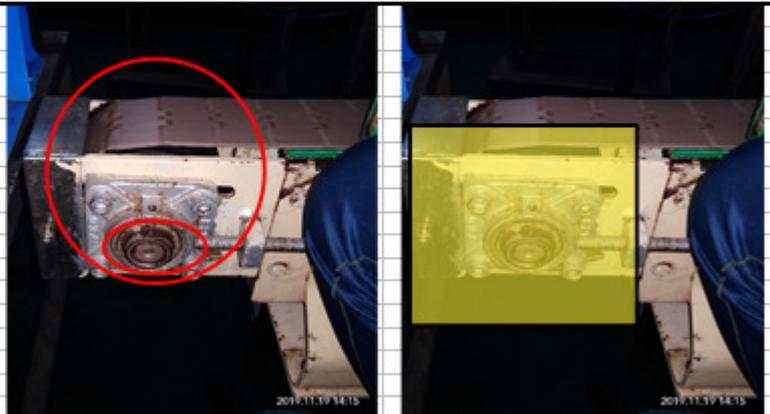


1. Safety Measures to be implemented as per recommendations in Risk Assessment report.
2. The safety control system of the machine needs to be redesigned as per EN ISO 13849-1.
3. All the safety functions should be comply with EN ISO 13849-1.



Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
2	Pinch point on Moving Part of conveyor	Left side of machine Operator	'Filling Station	High	200

HAZARD No.: 2		TITLE OF HAZARD: Pinch point on Moving Part of conveyor				Date: 19-11-2019					
Type of Hazard: 1.13 - Moving elements			Location: Left side of machine Operator		Zone: Filling Station						
RISK ASSESSMENT OF THE CURRENT STATE				life phases: Production; -							
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN		
Possible occurrence	5.0	Constantly	5.0	Hand or feet amputation	8.0	1-2 persons	1.0	High	200.0		
<b>Comment:</b> Empty Pouch have been loaded manually on the pouch transfer conveyor by two operator. There is gap between conveyor & conveyor guard that cause pinch point.											
<b>CONTROL MEASURES PROPOSED</b>											
<b>Mechanical Cover</b> Provide mechanical protective cover on both side of the conveyor to close the gap. EN ISO 14120 Safety standard for principle of safety guard designed to be referred to comply safety requirement. Cover to be provided for the open access of Motor shaft which drive the conveyor.											
<b>Normative basis:</b> EN ISO 12100, EN ISO 14120							S	F	P	Cat.	PLr
<b>SRP/CS:</b>							-	-	-	-	-



Photos Of Hazard

Safety Control Measure proposed



Note :-

Mechanical Cover to be provided to restrict pinch points.

Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
3	Liquid Spillage	Filling Station Sensor	'Filling Station	Low	50

HAZARD No.: 3		TITLE OF HAZARD		Liquid Spillage		Date:		19-11-2019			
Type of Hazard: 8.11 - Human error / wrong behavior (unintentionally or due to poor design)		Location: Filling Station Sensor			Zone: Filling Station						
RISK ASSESSMENT OF THE CURRENT STATE				life phases: Production; -							
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN		
Possible occurrence	5.0	Constantly	5.0	Disease at medium-term	2.0	1-2 persons	1.0	Low but significant	50.0		
Comment: Filling station sensor does not recognise pouch & other substance. As soon as sensor sense the object, machine discharge the liquid.											
CONTROL MEASURES PROPOSED											
<p>In case if pouch is not available liquid falls down in bucket, but it may cause spillage on hand or body part of the operator. Spillage on the floor need to be cleaned on regular intervals.</p> <p>To avoid spillage, sensor should sense &amp; discharge the liquid only if pouch is present. Any other object sensed by the sensor it should restrict the discharge of the liquid.</p>											
Normative basis:							S	F	P	Cat.	PLr
SRP/CS:							-	-	-	-	-

Note:-

- Pouch filling sensor that will sense only pouch & avoid spillage of liquid in case if sensor sense any other object.

Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
4	Improper cable connection	Front side Filling Station	Filling Station	High	60

HAZARD No.: 4		TITLE OF HAZARD: Improper cable connection			Date: 19-11-2019							
Type of Hazard: 2.10 - Direct electrical contact			Location: Front side Filling Station		Zone: Filling Station							
RISK ASSESSMENT OF THE CURRENT STATE			life phases: Production; Maintenance; Cleaning; -									
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN			
Possible -but unusual	2.0	Daily	2.5	Critical illness	12.0	1-2 persons	1.0	High	60.0			
Comment: Cable cut is fixed with conventional tape. Live parts of the cable can come in direct contact with operator.												
CONTROL MEASURES PROPOSED												
Junction box to be used or cable to be replaced.												
Normative basis:								S	F	P	Cat.	PLr
SRP/Cs:								-	-	-	-	-

Photos of Hazard



Safety Control Measures Proposed

1. Electrical cable to be replaced.
2. In case of joints best engineering practice to be followed for example junction box.

Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
5	Access to moving object	Bottom side of Conveyor	Filling Station	High	100

HAZARD No.: 5		TITLE OF HAZARD: Access to Filling station			Date: 19-11-2019						
Type of Hazard: 8.11 - Human error / wrong behavior (unintentionally or due to poor design)		Location: Bottom side of Conveyor		Zone: Filling Station							
RISK ASSESSMENT OF THE CURRENT STATE			life phases: Production; Maintenance; Cleaning; -								
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN		
Possible occurrence	5,0	Daily	2,5	Disease at long-term	8,0	1-2 persons	1,0	High	100,0		
Comment: Pouch transfer conveyor has access from bottom side.											
CONTROL MEASURES PROPOSED											
- Conveyor to be covered with guards from bottom side to restrict the access											
Normative basis:							S	F	P	Cat.	PLr
SRP/CS:							-	-	-	-	-

Photos of Hazard

Safety Control Measures Proposed



Note:-

1. Conveyor to be covered from bottom side to avoid access to the rotating parts.

Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
6	Access to the linear motion	'Inside filling unit	Filling Station	High	160

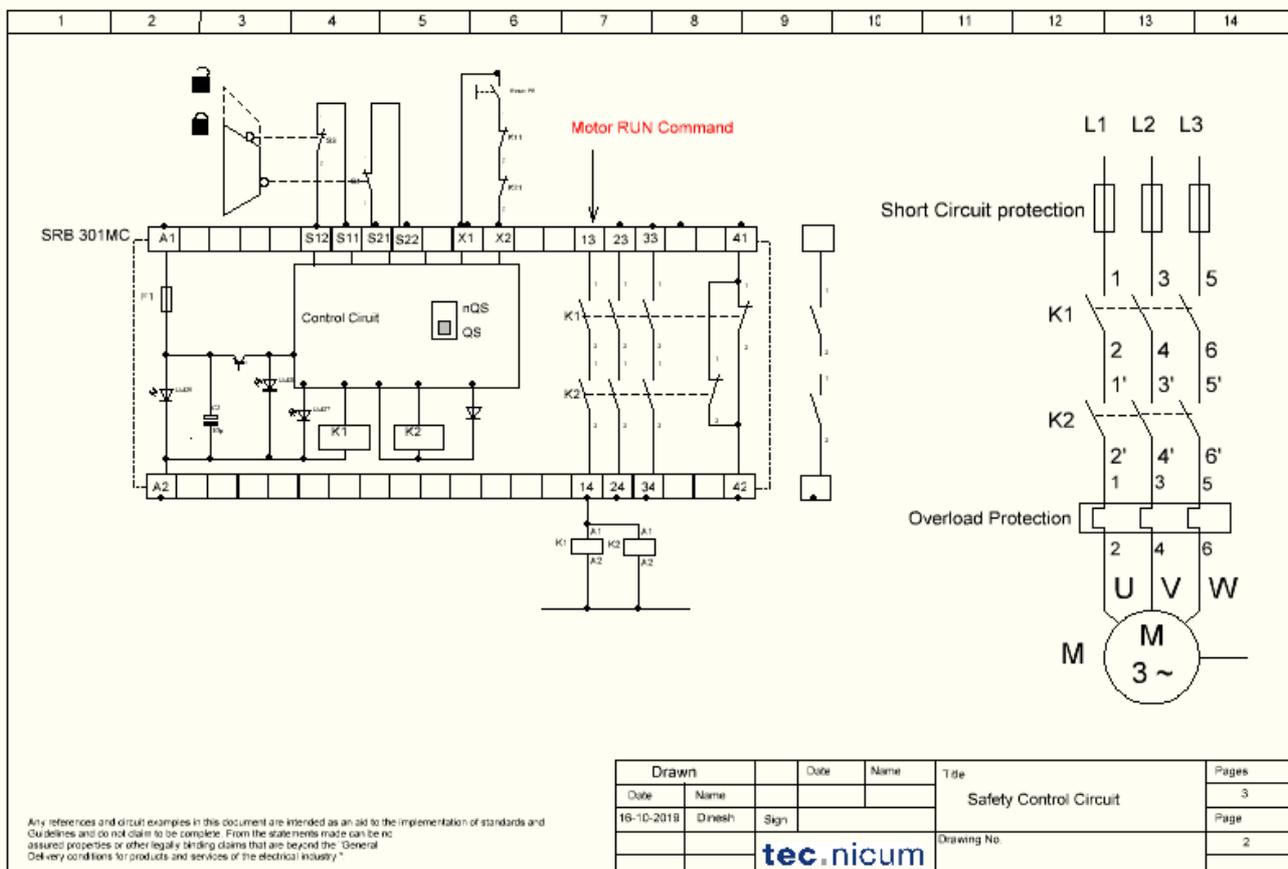
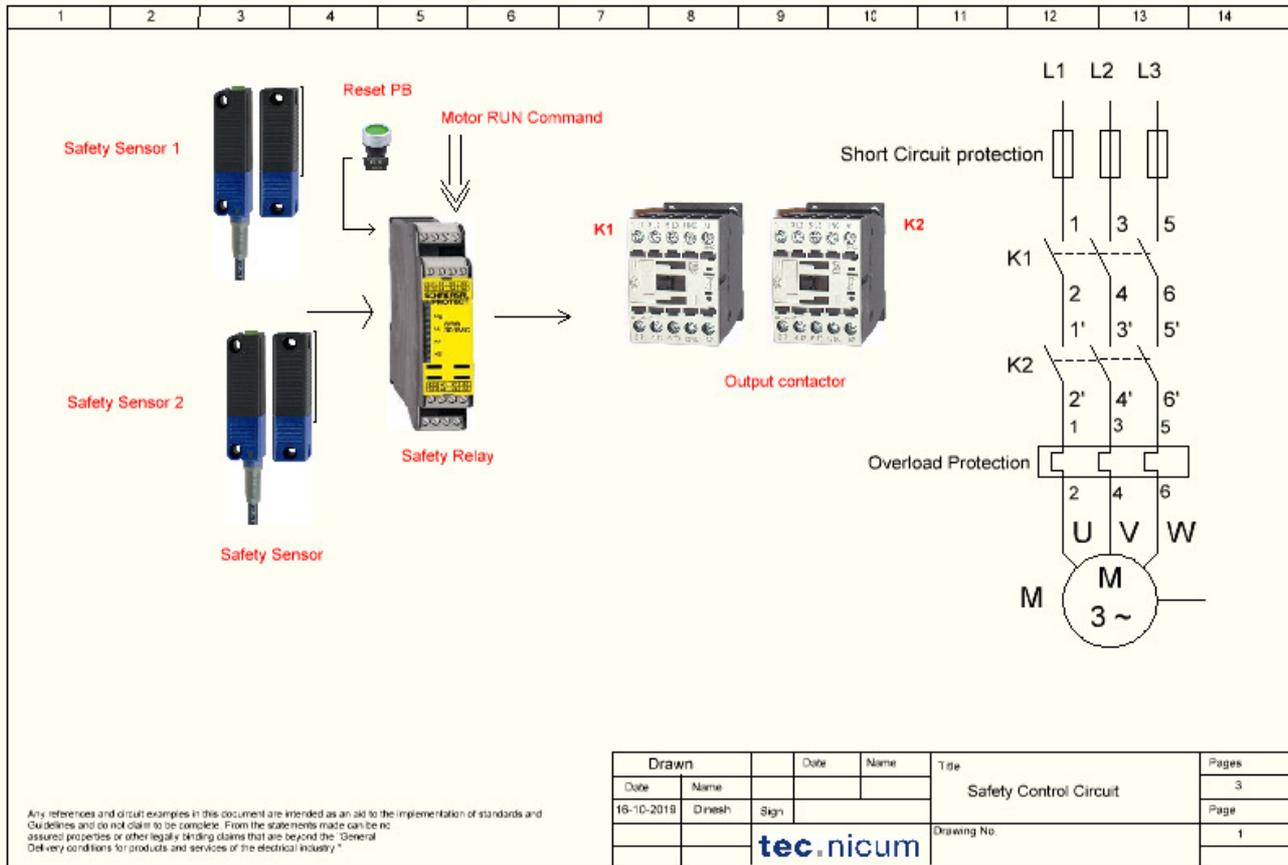
HAZARD No.: 6		TITLE OF HAZARD: Access to the linear motion			Date: 19-11-2019				
Type of Hazard: 1.13 - Moving elements			Location: Inside filling unit		Zone: Filling station				
RISK ASSESSMENT OF THE CURRENT STATE			life phases: Production; Maintenance; Cleaning; -						
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN
Probable -no surprise	8.0	Daily	2.5	Hand or feet amputation	8.0	1-2 persons	1.0	High	160.0
Comment: Linear pneumatic motion are present on the top of Filling machine. They are covered by guards but guard monitoring sensor are not available.									
CONTROL MEASURES PROPOSED									
Guard to be monitored by using Safety sensor. As an when guards are opened linear motion of the system should be restricted. Sensor to be wired with Safetyrelays as per EN ISO 13849-1									
Normative basis: EN ISO 12100, EN ISO 13849-1				\$	F	P	Cat.	PLr	
SRP/CS: Safety Sensor with Safetyrelay				S2	F2	P1	3	d	



Safety Circuit:-



Door Sensor



Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
7	Improper routing of pneumatic pipe & cable	'Bottom side	Filling Station	High	100

HAZARD No.: 7		TITLE OF HAZARD: Improper routing of pneumatic pipe & cable			Date: 19-11-2019							
Type of Hazard: 8.11 - Human error / wrong behavior (unintentionally or due to poor design)		Location: Bottom side		Zone: Filling Station								
RISK ASSESSMENT OF THE CURRENT STATE				life phases: Production; Maintenance; Cleaning; -								
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN			
Possible occurrence	5.0	Daily	2.5	Disease at long-term	8.0	1-2 persons	1.0	High	100.0			
Comment: Pneumatic Pipe & cables routed on bottom side of filling station are not proper. They may lead to the accident.												
CONTROL MEASURES PROPOSED												
Pneumatic Pipe & Electrical cable routing has to be made in proper way.												
Normative basis: EN ISO 12100								S	F	P	Cat.	PLr
SRP/CS:								-	-	-	-	-

Note:-

1. Safety control measure to be implemented as per report.
2. All pneumatic pipes & electrical cables to routed properly & separately.

Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
8	Dissipation of Pneumatic Air	'Bottom side	Filling Station	High	100

HAZARD No.: 8		TITLE OF HAZARD			Disipation of Pneumatic Air		Date: 19-11-2019				
Type of Hazard: 1.9 - High pressure				Location: Bottom Side		Zone: Filling Station					
RISK ASSESSMENT OF THE CURRENT STATE				life phases: Production; Maintenance; Cleaning; -							
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN		
Possible occurrence	5.0	Daily	2.5	Disease at long-term	8.0	1-2 persons	1.0	High	100.0		
<b>Comment:</b> Pneumatic Valve provided are not having fail-safe design for dissipation of Air											
CONTROL MEASURES PROPOSED				 							
<b>Dump Valve</b> Pneumatic air to be released upon shut down of the machine. Dump valve is recommended to use to dissipate the residual air. Loss of pressure or pressure drop shall not expose persons to a hazard and should not damage the machinery.											
<b>Normative basis:</b> EN ISO 12100 , EN 4414							S	F	P	Cat.	PLr
<b>SRP/CS:</b>							-	-	-	-	-

Note: -

1. Safety Measures to be implemented as per recommendations in Risk Assessment report.

Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
9	Improper Electric Switches	back side	Filling Station	High	75

HAZARD No.: 9		TITLE OF HAZARD: Improper Electric Switches			Date: 19-11-2019						
Type of Hazard: 2.10 - Direct electrical contact			Location: back side of the machine		Zone: Filling station						
RISK ASSESSMENT OF THE CURRENT STATE			life phases: Maintenance; Cleaning; -								
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN		
Possible -but unusual	2.0	Daily	2.5	Fatal, severe paralysis	15.0	1-2 persons	1.0	High	75.0		
Comment: Electrical Switches are broken & cap are missing which lead to the direct contact & cause serious hazard.											
CONTROL MEASURES PROPOSED											
Proper fitting of Electrical switches with cap & include the same in maintenance schedule											
											
Normative basis:							S	F	P	Cat.	PLr
SRP/CS:							-	-	-	-	-

Note: -

1. Safety Measures to be implemented as per recommendations in Risk Assessment report.



Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
10	'Electrical Panel	Back side	Filling Station	High	90

HAZARD No.: 10		TITLE OF HAZARD: <b>Electrical Panel</b>			Date: 19-11-2019							
Type of Hazard: 8.11 - Human error / wrong behavior (unintentionally or due to poor design)		Location: Back Side		Zone: Filling & Sealing Station								
RISK ASSESSMENT OF THE CURRENT STATE			life phases: Production; Maintenance; Cleaning; -									
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN			
Possible occurrence	5.0	Weekly	1.5	Critical illness	12.0	1-2 persons	1.0	High	90.0			
Comment: Control panel is not properly maintained. Jumpers, cable terminals are not properly fixed												
CONTROL MEASURES PROPOSED												
<p>Electrical Panel to be maintained properly</p> <p>Electrical panel to be maintained properly. Jumpers should not be made inside panel without documentation &amp; authorisation. Live parts must be covered by the polycarbonate sheet.</p>												
Normative basis:								S	F	P	Cat.	PLr
SRP/CS:								-	-	-	-	-

Photo Of Hazard



Proposed Safety Control Measure



Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
11	'Electrical Panel	Back side	Filling Station	High	100

HAZARD No.: 11		TITLE OF HAZARD Pinch during pouch sealing			Date: 19-11-2019						
Type of Hazard: 8.11 - Human error / wrong behavior (unintentionally or due to poor design)		Location: Front side		Zone: Sealing Station							
RISK ASSESSMENT OF THE CURRENT STATE		life phases: Production; Maintenance; Cleaning; -									
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN		
Possible occurrence	5.0	Constantly	5.0	Loss 1-2 limbs	4.0	1-2 persons	1.0	High	100.0		
Comment: Operator is holding the pouch in sealing station during the process. Guard are restricting the access to the sealing point.											
CONTROL MEASURES PROPOSED											
Guard to be fixed with TROX Guards are restricting the access, but they need to be fixed by using TROX bolt. Two hand control station is recommended which will ensure engagement of both hands & restrict the access at the pinch point.											
Normative basis: EN ISO 12100, EN ISO 14120							\$	F	P	Cat.	PLr
SRP/CS:							-	-	-	-	-

Photos Of Hazard

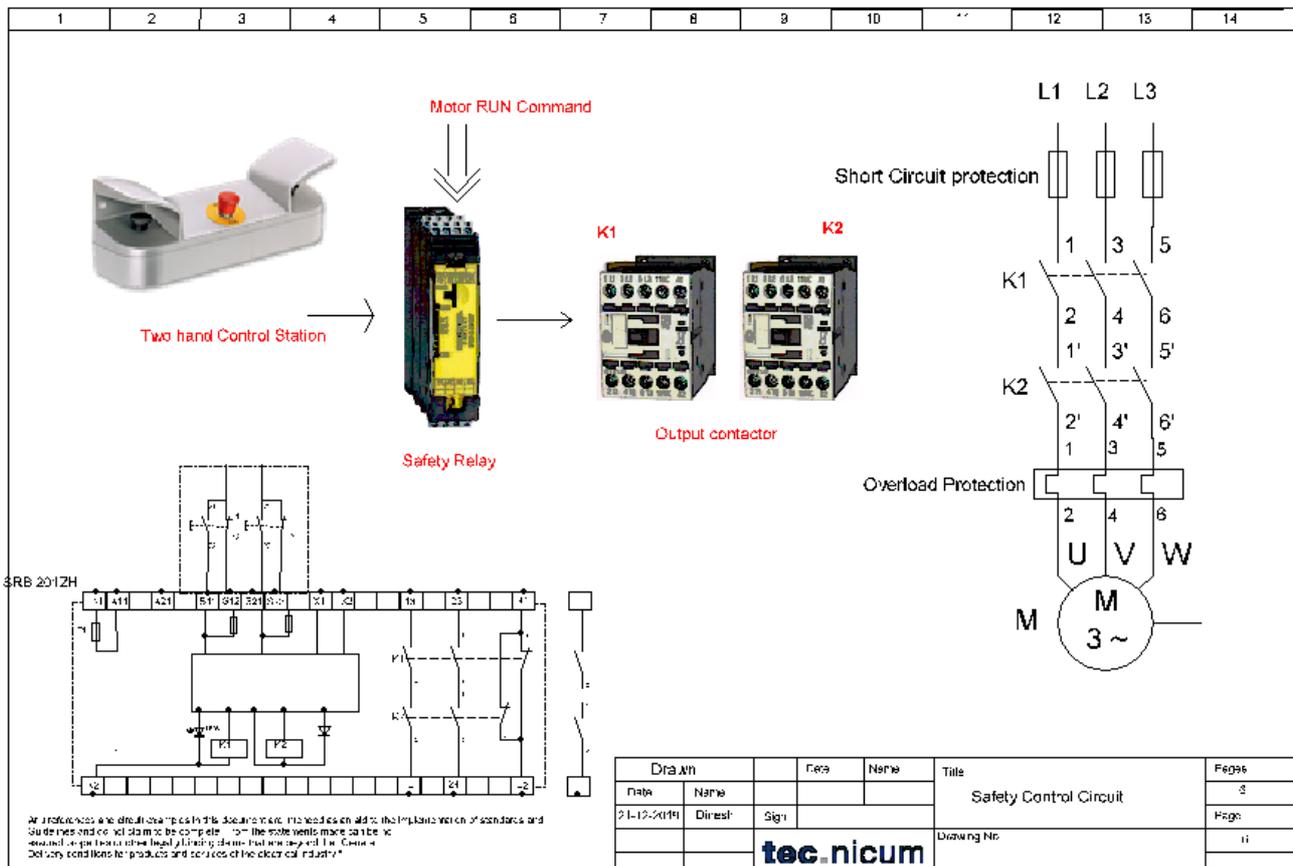


Proposed Safety control Measure



Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
12	Crushing of finger	Front side & Bottom side	Filling Station	High	100

HAZARD No.: 12		TITLE OF HAZARD: <b>Crushing of finger</b>		Date: 19-11-2019							
Type of Hazard: 10. - Combination of multiple hazards / hazardous situations			Location: Front side & Bottom side	Zone: Sealing Station							
RISK ASSESSMENT OF THE CURRENT STATE			life phases: Production; Maintenance; Cleaning; -								
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN		
Possible occurrence	5.0	Constantly	5.0	Loss 1-2 limbs	4.0	1-2 persons	1.0	High	100.0		
<b>Comment:</b> Operator operates the sealing unit by using normal limit switch provided in bottom side of the machine. This switch is operated by the operator foot when both hands are holding the pouch in sealing unit.											
<b>CONTROL MEASURES PROPOSED</b> <b>Two hand Control station</b> Two hand control station to be installed that will ensure the engagement of both hands while sealing the pouch. Malfunction of Foot operated limit switch & hand hold pouch can cause injury to the operator.											
											
<b>Normative basis:</b> EN 574, EN ISO 12100, EN ISO 13849-1							S	F	P	Cat.	PLr
<b>SRP/CS:</b> Safety Two Hand control station with Safety Relay							S2	F2	P1	3	d



<b>SCHMERSAL Materials</b>						
<b>Sl No</b>	<b>Safety Component Description</b>	<b>Part Code</b>	<b>Description</b>	<b>Quantity</b>	<b>Unit Price</b>	<b>Total Price</b>
1	RSS 36-I2-D-R-ST	101214773	RFID coded safety switch	2	19952	79808
2	RST 36-1	101213820	Actuator for RFID safety switch	2	2463	9852
3	A-K8P-M12-S-G-15M-GY-1-X-A-1	101209961	15mtr connector cable	2	10548	42192
4	SEP01.0.4.S.0.22/E1	110000524	Two Hand Control Station	1	20501	20501
3	PROTECT-IE-02	101182806	Input expander to connect safety switch / emergency stop	1	10509	10509
4	MBK 311 YE-ADRR40RT-2NC	110100052	E stop box with 2 NC contacts	2	2387	4774
5	SRB 301MC-24V	101190684	safety relay	2	16373	32746
6	SRB -E -201 ST	103008067	Safety relay - Two Hand Control Station	1	25452	25452

<b>ELECTRICAL PRODUCT</b>						
<b>S/N</b>	<b>DESCRIPTION</b>			<b>QTY</b>	<b>HSN CODE</b>	<b>Unit Price</b>
1	Panel Box WxHxD (4000X400X150) MS SS304			1	85371000	110000.00
2	Power Supply (Input 220VAC, Output 24VDC 6A)			2		
3	MCB 2-Pole			2		
4	Safety Contactor 24VDC			4		
5	Wire (7C X 0.5mm)			100		
6	Conduit, (PG13.5)			50		
7	Conduit Gland, (PG13.5)			20		
8	Door Switch Mounting Bracket SS304			12		

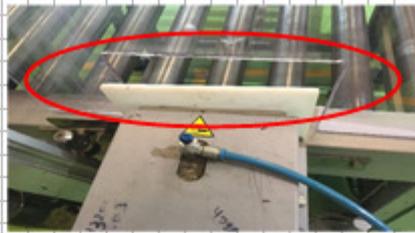
<b>MECHANICAL GUARDING PRODUCT</b>						
<b>S/N</b>	<b>DESCRIPTION</b>	<b>MATERIAL</b>		<b>QTY</b>	<b>HSN CODE</b>	<b>Unit Price</b>
1	Convayer end point cover	SS 304			73080000	40000
2	Conveyor Bottom Side Cover	SS 304	160*1000 - 4Nos.	4		
3	Bottom side cover of filler	SS 304				
1.00	<b>Installation Cost</b>				998736	60000
<b>Total Cost</b>						<b>435834</b>

**Details and assessment AFTER control measures**

No.	Title of hazard	Location	Zone	PLr	PL	Risk level (evaluation)
1	Emergency stop with non-safe contact	In front of the operator	Filling Station	-	-	Acceptable or very low ●
2	Pinch point on Moving Part of conveyor	Left side of machine Operator	Filling Station	-	-	Acceptable or very low ●
3	Liquid Spillage	Filling Station Sensor	Filling Station	-	-	Acceptable or very low ●
4	Improper cable connection	Front side Filling Station	Filling Station	-	-	Acceptable or very low ●
5	Access to moving object	Bottom side of Conveyor	Filling Station	-	-	Acceptable or very low ●
6	Access to the linear motion	Inside filling unit	Filling station	-	-	Acceptable or very low ●
7	Improper routing of pneumatic pipe & cable	Bottom side	Filling Station	-	-	Low but significant ●
8	Dissipation of Pneumatic Air	Bottom Side	Filling Station	-	-	Acceptable or very low ●
9	Improper Electric Switches	back side of the machine	Filling station	-	-	Acceptable or very low ●
10	Electrical Panel	Back Side	Filling & Sealing Station	-	-	Acceptable or very low ●
11	Pinch during pouch sealing	Front side	Sealing Station	-	-	Low but significant ●
12	Crushing of finger	Front side & Bottom side	Sealing Station	-	-	Acceptable or very low ●

Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
13	Access to the Pusher Arm	Rear side of the Machine	Pusher	High	64

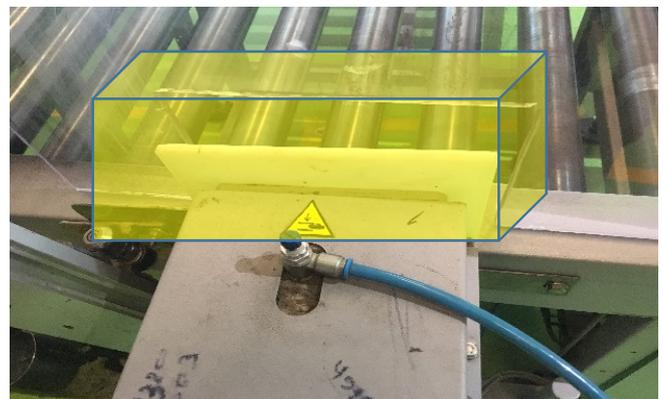
HAZARD No.: 13		TITLE OF HAZARD: Pinching hazard			Date: 19-11-2019							
Type of Hazard: 1.3 - Approach of a moving element to a fixed part		Location: Rear side of the Machine		Zone: Pusher								
RISK ASSESSMENT OF THE CURRENT STATE			life phases: Production / Maintenance; Maintenance / Cleaning; -									
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN			
Probable -no surprise	8.0	Hourly	4.0	Disease at medium-term	2.0	1-2 persons	1.0	High	64.0			
Comment: There is linear movement of pusher and a opening is there which is creating possible pinch point												
CONTROL MEASURES PROPOSED												
<p><b>Fixed guard with Torx screws*</b> The existing machine has linear movement pusher and a opening is there for pusher movement creating pinch point</p> <p>Considering risk reduction measure implemented on pusher this hazard is not accepted and to avoid this hazard one safetyguard should be implemented covering the opening and the safetyguard should be designed as per EN ISO 14120 standards</p>												
Normative basis: EN ISO 12100:2012; ISO 14120								S	F	P	Cat.	PLr
SRP/CS:								-	-	-	-	-



Photos Of Hazard



Proposed Safety control Measure



Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
14	Emission of Hazardous substances	Outside of the Machine	Pusher	Low	48

HAZARD No.: 14		TITLE OF HAZARD Emission of Hazardous substances			Date: 19-11-2019						
Type of Hazard: 7.9- Emission of hazardous substances				Location: Outside of the Machine.		Zone: -Pusher					
RISK ASSESSMENT OF THE CURRENT STATE				life phases: Production; Production / Maintenance; -							
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN		
Unlikely - but could occur	1.0	Hourly	4.0	Critical illness	12.0	1-2 persons	1.0	Low but significant	48.0		
Comment: Accidental activation of ink jet labeller											
CONTROL MEASURES PROPOSED											
<p>Emission of hazardous substances*</p> <p>There is ink jet labeller for labelling the box after weighing there is single photo sensor for activation of that ink jet labeller there is possibility of accidental activation of that ink jet labeller and possibility of ink going into eyes of person working on the conveyor is there that could lead to hazardous situation. To avoid this situation we should train operators and persons working near to the labeller for safe usage and during maintenance we should provide one cover or cap on the labeller for avoiding accidental activation</p>											
Normative basis: EN ISO 12100:2012							S	F	P	Cat.	PLr
SRP/CS:											

Note: -

1. Safety Measures to be implemented as per recommendations in Risk Assessment report.

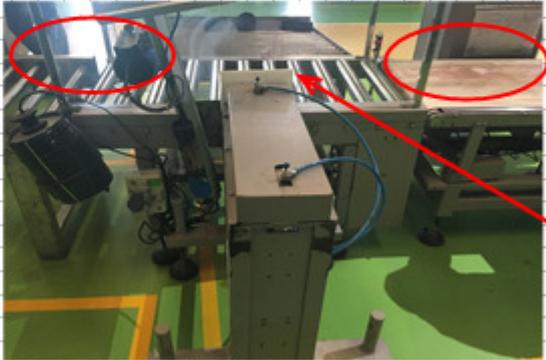
Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
15	Energy Isolation Pneumatic	Below the Machine	Pusher	Low	40

HAZARD No.: 15		TITLE OF HAZARD Energy Isolation Pneumatic			Date: 19-11-2019						
Type of Hazard: 11.3 - Unexpected / sudden start-up		Location: Below the Machine		Zone: Pusher							
RISK ASSESSMENT OF THE CURRENT STATE			life phases: Maintenance; Maintenance / Cleaning; -								
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN		
Possible occurrence	5,0	Monthly	1,0	Disease at long-term	8,0	1-2 persons	1,0	Low but significant	40,0		
<b>Comment:</b> The Pneumatic regulator installed there is not having any provision for LOTO so during maintenance there is possibility of a accidentally start up of the air of the pusher and possibility of hazardous situation											
<b>CONTROL MEASURES PROPOSED</b>											
<b>LOTO</b> Considering risk reduction measures implemented on machine this hazard is not accepted and possible pneumatic LOTO isolator switch should be used  The LOTO policies should be implemented on machine during maintenance activities.											
<b>Normative basis:</b> EN ISO 12100:2012;							S	F	P	Cat.	PLr
<b>SRP/CS:</b>							-	-	-	-	-

Note: -

1. Safety Measures to be implemented as per recommendations in Risk Assessment report.

Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
16	Access to the pinch point	Below the Machine	Pusher	High	80

HAZARD No.: 16		TITLE OF HAZARD: Access to the pinch point			Date: 19-11-2019						
Type of Hazard: 1.13 - Moving elements			Location: On pusher		Zone: Pusher						
RISK ASSESSMENT OF THE CURRENT STATE			life phases: Production / Maintenance; -								
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN		
Possible occurrence	5.0	Hourly	4.0	Loss 1-2 limbs	4.0	1-2 persons	1.0	High	80.0		
Comment: Access to the pinch points from both the sides											
CONTROL MEASURES PROPOSED											
<p>Access to the pinch point'</p> <p>Access to the pinching points are there from all the sides of pusher the tunnel guards should be extended so that hand should not be easily reach to the pinching points which will not lead to hazardous situation and guards should</p>											
Normative basis: EN ISO 12100 EN ISO 14120							S	F	P	Cat.	PLr
SRP/CS:							-	-	-	-	-

Photos of Hazard

Proposed Safety Control Measure



Note:-

1. Tunnel Guard of 850 mm in length to be provided on both side of machine.
2. Guard to be fixed with TROX bolt.
3. Guard to be designed as per ISO 14120

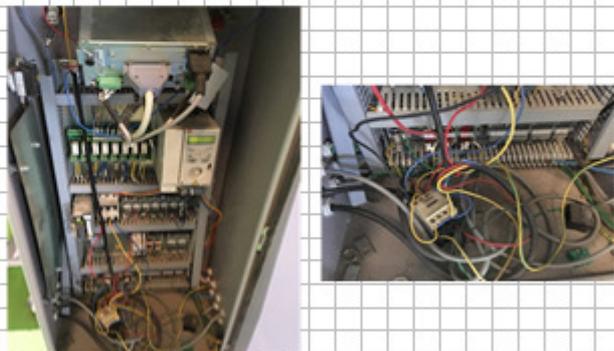
Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
17	Residual pneumatic air dissipation	Below Control Panel	Pusher	LOW	40

HAZARD No.: 17		TITLE OF HAZARD: Residual pneumatic air dissipation			Date: 19-11-2019						
Type of Hazard: 1.9 - High pressure			Location: Control Panel		Zone: Pusher						
RISK ASSESSMENT OF THE CURRENT STATE			life phases: Maintenance: -								
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN		
Possible -but unusual	2.0	Daily	2.5	Disease at long-term	8.0	1-2 persons	1.0	Low but significant	40.0		
Comment: Residual energy dissipation is not assured.											
<b>CONTROL MEASURES PROPOSED</b>											
<p>Dissipation of Residual Pneumatic energy In case of power failure all stored pneumatic energy should get released. Safety component to be used complying to EN 4144 LOTO provision to be ensured &amp; LOTO procedure to be defined</p>											
Normative basis: EN 4144							S	F	P	Cat.	PLr
SRP/CS:							-	-	-	-	-

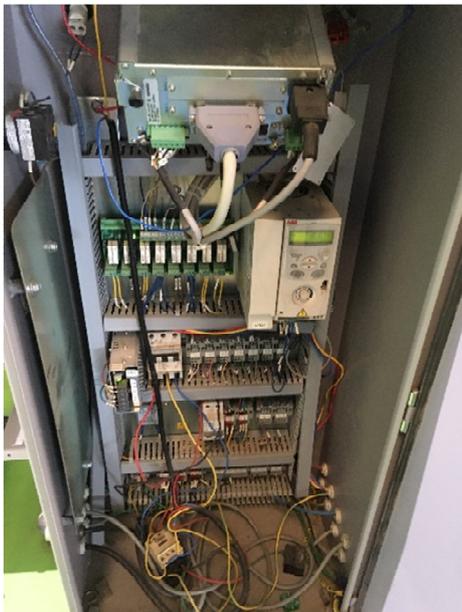
Note: -

1. Safety Measures to be implemented as per recommendations in Risk Assessment report.

Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
18	Electrical Panel	'Weigher Control Panel'	Check Weigher with Pneumatic pusher	High	60

HAZARD No.: 18		TITLE OF HAZARD: Electrical Panel			Date: 19-11-2019				
Type of Hazard: 2.10 - Direct electrical contact			Location: 'Weigher Control Panel'		Zone: -Check Weigher with Pneumatic pusher				
RISK ASSESSMENT OF THE CURRENT STATE			life phases: -						
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN
Possible occurrence	5.0	Monthly	1.0	Critical illness	12.0	1-2 persons	1.0	High	60.0
Comment: The electrical control panels should be maintained properly.									
CONTROL MEASURES PROPOSED									
<p><b>Electrical Control Panel</b> -The electrical control panel should be maintained properly.</p> <p>-All the trunking covers should be fixed. -All the cables and wires should be tied properly. -All the components should be fixed on back plate. -The electrical control panel should be marked for its function.</p> <p>Considering risk reduction measure implemented on the machine, this hazard is accepted as electrical panel is maintained properly</p>									
Normative basis: EN 60204-1				S	F	P	Cat.	PLr	
SRP/CS:				-	-	-	-	-	-

Photos of Hazard



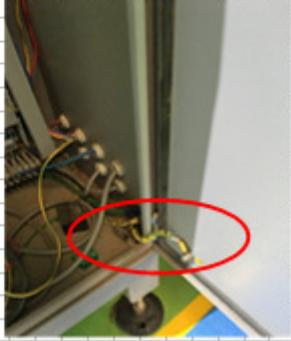
Proposed Safety Control Measure



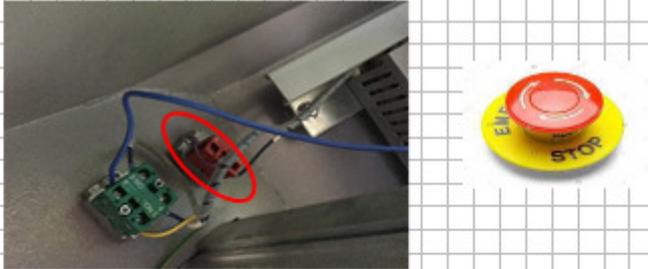
Note:-

1. Safety Measures to be implemented as per recommendations in Risk Assessment report.

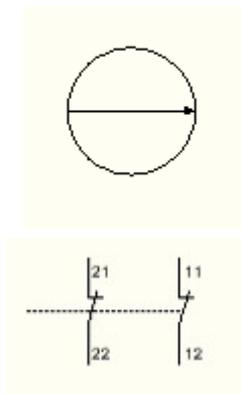
Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
19	Electrical Control Panel Earthing	'Weigher Electrical Panel'	Check Weigher with Pneumatic pusher	Acceptable	7.5

HAZARD No.: 19		TITLE OF HAZARD: Electrical Control Panel Earthing				Date: 19-11-2019					
Type of Hazard: 2.10 - Direct electrical contact			Location: Weigher Electrical Panel'		Zone: Check Weigher with Pneumatic pusher						
RISK ASSESSMENT OF THE CURRENT STATE				life phases: -							
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN		
Very difficult - but conceivably	0.5	Monthly	1.0	Fatal, severe paralysis	15.0	1-2 persons	1.0	Acceptable or very low	7.5		
Comment: Panel is earthed & panel door is connected to earthing											
CONTROL MEASURES PROPOSED											
<p>Panel Earthing Panel is earthed &amp; panel door is connected to earthing. Need to ensure earthing from two different sources</p>											
											
Normative basis:							S	F	P	Cat.	PLr
SRP/CS:							-	-	-	-	-

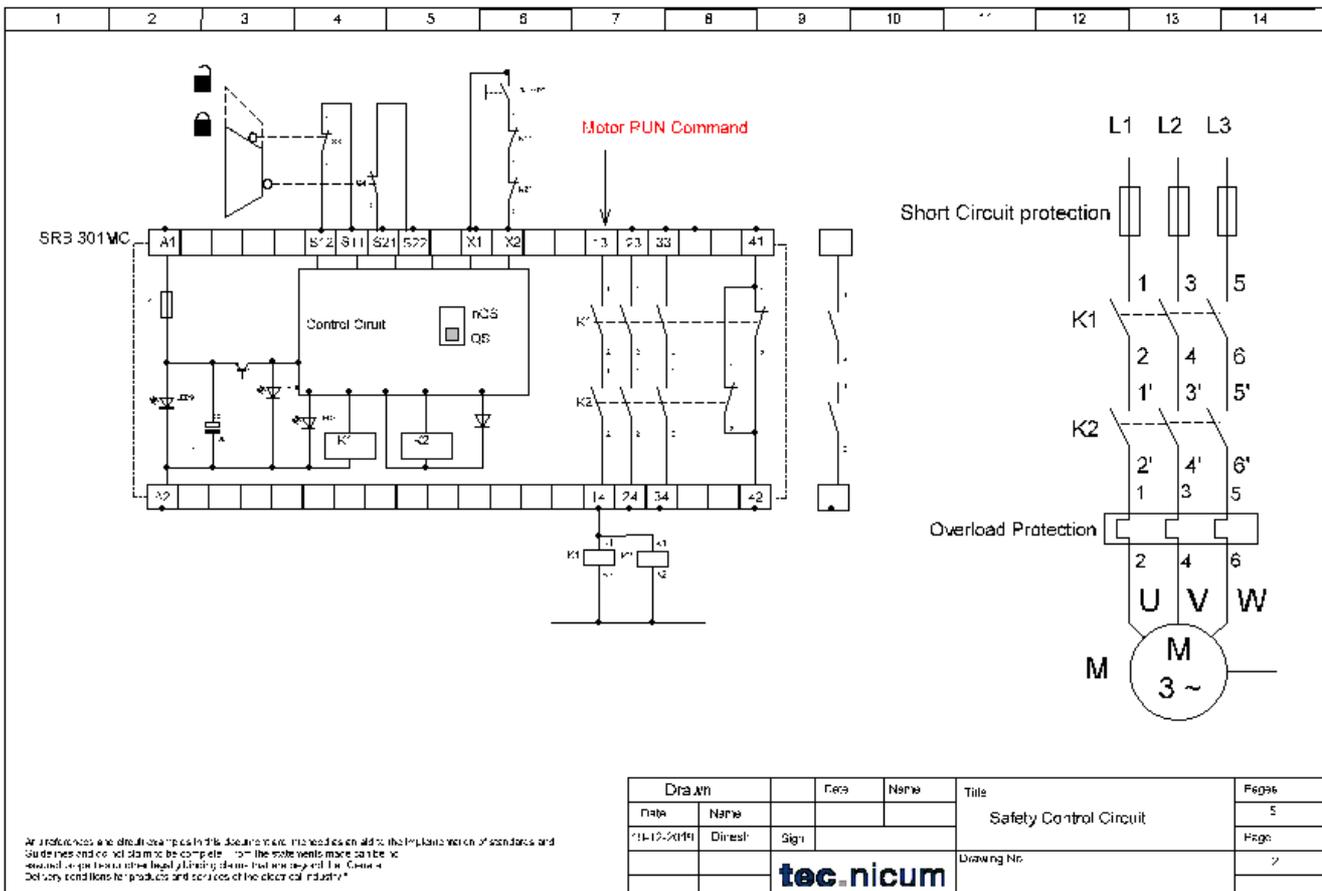
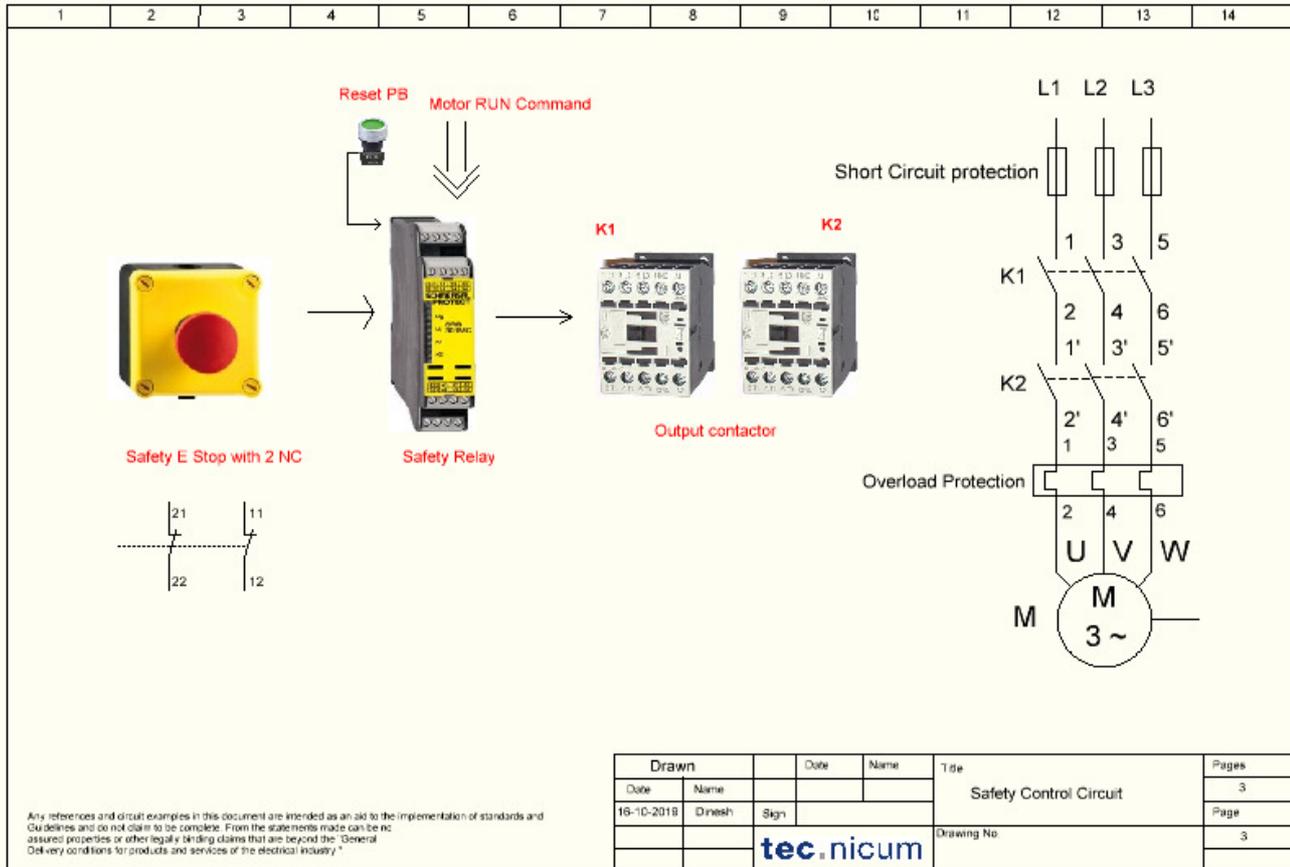
Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
20	'Single channel Emergency Stop without Monitoring	'Weigher Electrical Panel	Check Weigher with Pneumatic pusher	High	60

HAZARD No.: 20		TITLE OF HAZARD Single channel Emergency Stop without Monitoring				Date: 19-11-2019			
Type of Hazard: 11.9 - Failure / poor design of the control system SRP/CS		Location: Weigher Electrical Panel		Zone: Check Weigher with Pneumatic pusher					
RISK ASSESSMENT OF THE CURRENT STATE				life phases: -					
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN
Possible -but unusual	2.0	Daily	2.5	Critical illness	12.0	1-2 persons	1.0	High	60.0
Comment: Single channel Emergency stop is used									
CONTROL MEASURES PROPOSED									
Dual Channel Emergency Stop as Per ISO 13850 Emergency stop used in panel is of single channel without monitoring with safety relay.									
Dual channel emergency stop with safety relay monitoring should be used. Emergency Stop should be used must be of red coloured with yellow background as per EN ISO 13850									
Normative basis: EN ISO 13850 EN ISO 13849-1				S	F	P	Cat.	PLr	
SRP/CS:				S2	F2	P1	3	d	

Note: -Proposed safety Control Measure



1. Safety Measures to be implemented as per recommendations in Risk Assessment report.
2. The safety control system of the machine needs to be redesigned as per EN ISO 13849-1.
3. All the safety functions should comply with EN ISO 13849-1.



Hazard No.	Title of hazard	Location	Zone	Risk level (evaluation)	HRN
21	Documentation- Electric Circuit Diagrams	Filling, Sealing Pusher	Akash Pack Line	High	60

<b>HAZARD No.:</b> 21		<b>TITLE OF HAZARD</b> Documentation- Electric Circuit Diagrams			<b>Date:</b> 19-11-2019							
<b>Type of Hazard:</b> 8.11 - Human error / wrong behavior (unintentionally or due to poor design)			<b>Location:</b> Filling, Sealing Pusher		<b>Zone:</b> Akash Pack Line							
<b>RISK ASSESSMENT OF THE CURRENT STATE</b>			<b>life phases:</b> Maintenance; -									
Probability of exposure	PE	Frequency of exposure	FE	Maximum probable loss	MPL	Number of persons at risk	NP	Risk level (evaluation)	HRN			
Possible occurrence	5.0	Monthly	1.0	Fatal, severe paralysis	15.0	1-2 persons	1.0	High	75.0			
<b>Comment:</b> There is no electrical circuit diagrams and operating manual available for the machine. Operators would be confused during maintenance and troubleshooting on the control system.												
<b>CONTROL MEASURES PROPOSED</b>												
All the documentation including updated electrical circuit diagram should be made available for the machine.												
												
<b>Normative basis:</b> EN 60204-1:2007; EN ISO 12100:2012; EN 82079-1:2012(5)								S	F	P	Cat.	PLr
<b>SRP/CS:</b>								-	-	-	-	-

Note :-

1. Operating manual & wiring diagram are not available on machine. Need to maintain the same on machine.
2. Modification in Electrical panel need to be documented & authorised by responsible person.

SCHMERSAL Materials						
SI No	Safety Component Description	Part Code	Description	Quantity	Unit Price	Total Price
3	PROTECT-IE-02	101182806	Input expander to connect safety switch / emergency stop	1	10509	10509
4	MBK 311 YE-ADRR40RT-2NC	110100052	E stop box with 2 NC contacts	2	2387	4774
5	SRB 301MC-24V	101190684	safety relay	2	16373	32746
MECHANICAL GUARDING PRODUCT						
S/N	DESCRIPTION	MATERIAL		HSN CODE	Unit Price	Total Price
1	Cylinder Cover	MS With ,Powder Coating		73080000	110000	110000
2	Pusher Back Side Pusher Right Side Pusher Machine Cover	MS Pipe, MS Sheet, MS Wiremess, MS Angle & Powder Coating				
1	<b>Installation Cost</b>			<b>998736</b>	<b>15000</b>	<b>30000</b>
<b>TOTAL Cost</b>						<b>188029</b>

### Details and assessment AFTER control measures

No.	Title of hazard	Location	Zone	PLr	PL	Risk level (evaluation)
13	Access to the Pusher Arm	Rear side of the Machine	Pusher	-	-	Acceptable or very low ●
14	Emission of Hazardous substances	Outside of the Machine.	-Pusher	-	-	Acceptable or very low ●
15	Energy Isolation Pneumatic	Below the Machine	Pusher	-	-	Acceptable or very low ●
16	Access to the pinch point	On pusher'	Pusher	-	-	Acceptable or very low ●
17	Residual pneumatic air dissipation'	Control Panel	Pusher	-	-	Low but significant ●
18	Electrical Panel	Weigher Control Panel'	Weigher with Pneumatic	-	-	Acceptable or very low ●
19	Electrical Control Panel Earthling	Weigher Electrical Panel''	Weigher with Pneumatic	-	-	Acceptable or very low ●
20	Single channel Emergency Stop without Monitoring	Weigher Electrical Panel''	Weigher with Pneumatic	-	-	Acceptable or very low ●
21	Documentation- Electric Circuit Diagrams	Filling, Sealing Pusher	Akash Pack Line	-	-	Acceptable or very low ●