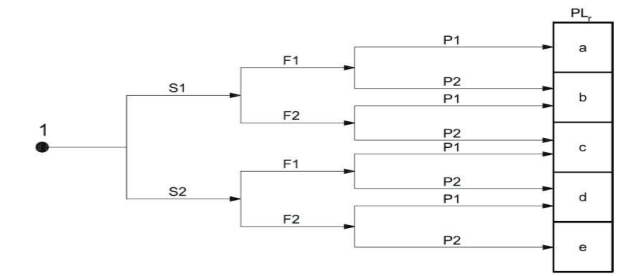


| PROTOCOL APPROVAL | | |
|----------------------------|-------------|--------------------|
| PREPARED BY | DESIGNATION | SIGNATURE AND DATE |
| Sahana I H | Automation | |
| REVIEWED BY BRML | DESIGNATION | SIGNATURE AND DATE |
| Vaibhav Bhosale | Automation | |
| Pabitra Hazra | Design | |
| REVIEWED BY STRIDES PHARMA | DESIGNATION | SIGNATURE AND DATE |
| | | |
| APPROVED BY STRIDES PHARMA | DESIGNATION | SIGNATURE AND DATE |
| | | |



Key
 1 starting point for evaluation of safety function's contribution to risk reduction
 L low contribution to risk reduction
 H high contribution to risk reduction
 PL_r required performance level

Risk parameters:
 S severity of injury
 S1 slight (normally reversible injury)
 S2 serious (normally irreversible injury or d
 F frequency and/or exposure to hazard
 F1 seldom-to-less-often and/or exposure to
 F2 frequent-to-continuous and/or exposure to
 P possibility of avoiding hazard or limiting
 P1 possible under specific conditions
 P2 scarcely possible

| | | | |
|-----------------------------------|---|-------------------------------|---|
| Assessment reference: | 16049 | Number of operatives: | 1 |
| Type of machine: | Sachet Cartoning Machine | Number of shifts per week: | |
| Machine location: | Bangalore | Usage (hours per week): | |
| Machine description: | Sachet Cartoning Machine | Operating manuals: | Supplied |
| Machine manufacturer: | BAR | SOP's | As required, per post assembly Hazop. |
| Machine model: | p780 | Operatives' training record: | |
| Machine serial number: | p780-16049-01-2022 | Warning signs: | As required, per post assembly Hazop. |
| Modifications from 'as-supplied': | None | Raw materials: | |
| Energy sources: | Electrical Power and Compressed Air | Maintenance manual: | Supplied |
| Energy source ratings: | Electrical - 3phase, 415V Pneumatic - Air @6bar. | Maintenance training record: | Operators & maintenance to be trained upon installation |
| Safety measures: | (eg. PLd safety architecture) | Access by untrained visitors: | Prohibited |
| Assessment carried out by: | OB, RB | | |
| Assessment date: | 23-08-2022 | | |
| Assessment reviewed by: | | | |
| Assessment review date: | | | |
| Version: | 1.0 | | |

| LO (Likelihood of Occurrence) | | |
|-------------------------------|-------------------|-------------------------------|
| 0.033 | Almost impossible | Only in extreme circumstances |
| 1 | Highly unlikely | Though conceivable |
| 1.5 | Unlikely | But could occur |
| 2 | Possible | But unusual |
| 5 | Even chance | Could happen |
| 8 | Probable | Not surprising |
| 10 | Likely | To be expected |
| 15 | Certain | No doubt |

| FE (Frequency of Exposure) | |
|----------------------------|------------|
| 0.5 | Annually |
| 1 | Monthly |
| 1.5 | Weekly |
| 2.5 | Daily |
| 4 | Hourly |
| 5 | Constantly |

| HRN | Risk |
|----------|------------------|
| 0-5 | Negligible |
| 5-50 | Low, significant |
| 50-500 | High |
| Over 500 | Unacceptable |

HRN = LO x FE x DPH x NP

| DPH (Degree of Possible Harm) | |
|-------------------------------|--|
| 0.1 | Scratch or bruise |
| 0.5 | Laceration or mild ill-effect |
| 2 | Break of minor bone or minor illness (temporary) |
| 4 | Break of major bone or major illness (temporary) |
| 6 | Loss of one limb, eye, hearing (permanent) |
| 10 | Loss of two limbs or eyes (permanent) |
| 15 | Fatality |

| NP (Number of Persons at risk) | |
|--------------------------------|---------------|
| 1 | 1-2 persons |
| 2 | 3-7 persons |
| 4 | 8-15 persons |
| 8 | 16-50 persons |
| 12 | 50+ persons |

RML Assumptions: Machine has no electronic guarding at all at initial assessment, frame is present.
Keywords: See "Example Keywords" sheet for further keywords

| No. | Assembly | Machine Location | Type of Hazard | Potential consequences | Comments | Initial assessment | | | | | | Action required | Re-assessment after taking action | | | | | Residual Risk Action Required | |
|-----|---|---|---|---|--|--------------------|-----|-----|------|------------------|--------------------------|---|-----------------------------------|-----|-----|------------|---------------------|-------------------------------|---|
| | | | | | | LO | FE | DPH | NP | HRN | Risk level | | LO | FE | DPH | NP | HRN | | Risk level |
| 6 | Outfeed Assembly | 1. Driver Pulley Assembly 2. Driven Pulley Assembly | Kinetic energy (Drawing in Nip Points/Crushing Shearing) | Injuries include amputations, lacerations, contusions crushing of tissues and bones, and broken bones. | Hazards - drawing in of operator getting caught in belt/tangled with power belt. Why is the hazard there - Conveyor running at linear speed >500mm/s. What drives the hazard - Electric Motor. How could harm be caused - Operator hand/clothing/hair becoming caught in Belt. Why would the hazard occur - Operator intervention or inspection around the conveyor. Potential occurrence of hazard - Possible Possible harm - Bruising, Lacerations, Break Minor Bone | 2 | 4 | 2 | 1 | 16 | Low, significant | Operator / Maintenance Staff Awareness Nip Point Warning Signs | 2 | 4 | 2 | 1 | 16 | Low, significant | Operator / Maintenance Staff Awareness and Training |
| | | Motor And Gearbox Assembly | Thermal Energy | 1. The winding insulation & bearing deteriorates 2. Increases in the temperature of an electric motor reduce its lifespan (Motor Ambient working temperature <=60 deg celsius) (Gearbox Ambient temperature <= 80 deg celsius) | Hazards - 1. Burns due to contact with hot Surface of the motor and Gearbox. 2. Motor insulation an get melted and can cause short circuits and permanent damage to the motor. Why is the hazard there - Motors with a gearbox combination drives the conveyor and tend to heat (extensive temperatures >80 deg celsius can be hazardous) What drives the hazard - Electrical Energy and Friction How could harm be caused - Operator in contact with hot motor and gearbox Surface. Why would the hazard occur - Operator intervention or inspection around the machine, intervention by maintenance personnel. Potential occurrence of hazard - Constantly. Possible harm - Minor burns. | 8 | 4 | 0.5 | 1 | 16 | Low, significant | Operator / Maintenance Staff Awareness Hot Surface Warning Signs | 5 | 4 | 0.5 | 1 | 10 | Low, significant | Operator / Maintenance Staff Awareness and Training |
| | 1. driver Pulley Assembly 2. Driven Pulley Assembly 3. Motor And Gearbox Assembly | 1. Noise 2. Vibration | Vibration can cause changes in tendons, muscles, bones and joints, and can affect the nervous system collectively these effects are known as Hand-Arm Vibration Syndrome (HAVS). Workers affected by HAVS commonly report 1. Attacks of whitening (blanching) of one or more fingers when exposed to cold 2. Tingling and loss of sensation in the fingers 3. Pain and cold sensations between periodic white fingers attacks 4. Loss of grip strength & Bone cysts in fingers and wrists 5. Noise may damage hearing - Stress - Hypersensitivity to noise - Increased blood Pressure Increased heart rate | Hazards - vibrates and generates excessive force in the bearing area and reduces the life of the machine Why is the hazard there - Electric Motor drives the belt regardless of any minute misalignment which may further cause vibration. What drives the hazard - Electrical Energy. How could harm be caused - Operator in contact with motor and gearbox Surface. Why would the hazard occur - Operator intervention or inspection around the machine, intervention by maintenance personnel. Potential occurrence of hazard - Constantly. Possible harm - 1. Vibration can cause changes in tendons, muscles, bones and joints (the highest around 8-16 Hz (Hertz or cycles per second)) 2. Noise may damage hearing (Permissible limit is 75 dB for daytime and 70 dB at night from 1m Distance) | 1.5 | 5.0 | 2.0 | 1.0 | 15.0 | Low, significant | Regular Maintenance | 1.5 | 2.0 | 1.0 | 4.5 | Negligible | Regular Maintenance | | |
| | Motor Assembly | EMF/ Electro static Burn Electrocution Parts becoming live under fault conditions / Short-circuit / Overload | Electrostatic sparks may have enough energy to produce electric shocks, cause electronic damage, spoil mechanical components Burn Electrocution Motor Overload may cause overheating of the motor and damage the windings of the motor | Hazards - electrical shock, fire and arc flash. Why is the hazard there - When power up the Electric Motor & its power cables are open and fed up floor What drives the hazard - Electrical Energy How could harm be caused - Operator in contact with hot motor and gearbox Surface. Why would the hazard occur - Operator intervention or inspection around the machine, intervention by maintenance personnel. Potential occurrence of hazard - Almost impossible Possible harm - Minor burns , Electrocution | 0.033 | 4 | 15 | 1 | 1.98 | Negligible | Use best practice design | 0.03 | 4 | 15 | 1 | 1.8 | Negligible | | |
| | | | | | | 0.033 | 4 | 0.5 | 1 | 0.066 | Negligible | Use best practice design | 0.03 | 4 | 0.5 | 1 | 0.06 | Negligible | |
| | | | | | | 0.033 | 4 | 0.5 | 1 | 0.066 | Negligible | Use best practice design | 0.03 | 4 | 0.5 | 1 | 0.06 | Negligible | Operator / Maintenance Staff Awareness and Training |
| | | | | | | 0.033 | 4 | 15 | 1 | 1.98 | Negligible | Use best practice design | 0.03 | 4 | 15 | 1 | 1.8 | Negligible | |