Technical Delivery Specification

F03 – Conveyor technology

This document describes the requirements for the delivery and documentation of systems.

Revision status:

This delivery regulation F03 replaces all previous regulations.

Version:	Site/s:	Description of the revision:	Date:
F01	Complete	Created	21.11.2016
F02	Page 10	Revised	27.04.2017
F03	Complete	Revised	28.02.2024

Responsible:	Hirschmann Automotive
Department:	T_TPM

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1 General

1.1 Area of Application

This Hirschmann factory standard specifies the delivery regulations for conveyor technology of machines, machinery systems and production facilities.

1.2 Deviations

Deviations from this delivery specification which may appear necessary or appropriate to the manufacturer, require written approval from Hirschmann Automotive.

1.3 Regulations, Norms, and Industry Standards

In addition to the requirements specified in this technical delivery specification, the contractor is fully responsible for all requirements applicable to their service arising from regulations (e.g. EC directives, regulations and other applicable laws) as well as from standards and generally accepted rules of technology, even if this technical delivery specification does not specify such in detail.

As far as regulations, standards and technical rules are referenced in this technical delivery specification, the contractor themselves must check whether they are applicable for their work and whether other regulations, standards and rules are also to be adhered to.

If in doubt, the contractor must immediately contact the client.

In addition, the contractor shall immediately notify the client if the contractor recognises or identifies, on the basis of their knowledge, that the service to be rendered by the contractor is not suitable for the intended purpose or suited only to a limited extent.

1.4 Set-up / replacement parts

Set up and replacement parts must be able to be changed quickly, without disassembling major assemblies and configuration work. These parts must be stored in suitable storage spaces of the system and also labelled accordingly (colour code or label). For necessary electrical or pneumatic connections on set-up and replacement parts, always use safe, lockable quick releases.

1.5 Space requirements and installation areas of conveyor systems

The contractor must provide a dimensioned plan view before the start of installation.

The contractor shall not commence construction until the client has given their written consent.

Freestanding feeders and automatic dispensers must always be designed to save space without restricting accessibility.

2 Conveyor technology for production parts

Conveyor belts are to be designed such that jams or deformations of the transported parts are not possible.

In general, the conveyor technology must be reproducible.

2.1 Angle and flat conveyor belts

- Dimensions
- Adjustment possibilities: height and inclination via bolt or clamping lever
- Read settings from scale
- Casters with parking brakes
- Specification for the cover (corrugated edge, temperature, material, etc.)
- Light barriers must be provided with a protective cover

2.2 Special conveyor belts

- See points as described in 2.1
- Install spray-proof bearings (pulleys)
- The installation situation must always be agreed with the client
- (e.g. rail system for injection moulding machines)

2.3 Separating drum

- Dimensions
- Adjustment possibilities: Height and inclination via bolt or clamping lever
- Read settings from scale
- Casters with parking brakes
- Specification of the rollers (clearance dimensions, material, etc.)
- The light barrier must be provided with a protective cover

3 Conveyor technology for bulk material

Conveyor belts for bulk material are to be equipped with moving/removable and see-through covers, which prevents accidental insertion and ejection of bulk materials. The cover must be designed ergonomically and suitable for both right- and left-handed people. A stop must be available for the covers.

Feeders and linear feeders should, where possible, have clearances or recesses for sprue and contamination to allow fall-through into a container.

Feed pots and linear feed rails must be adjustable in all directions no less than 5 mm.

The covers of the linear feeder are to be attached with wing nuts or thumbscrews to enable removal without tools.

All feed pots and bunkers must be provided with foldable Polycarbonate covers.

The entire belt section must be encased on the sides with Polycarbonate. The cover must run at least 5 cm over the maximum upper and lower position of the belt. With belts where the surface plays an important role for further processing, a removable cover must also be mounted.

If filling is to be carried out manually, the maximum filling level must be clearly visible and permanent.

Fill level monitoring must be included with all feed pots.

All sorting blower air nozzles must be switched on/off automatically during non-use (bunker section full, pot turned off, etc.) via a valve (time-controlled).

Good access to feeding heads and linear transport rails must be ensured for cleaning work.

It is to be ensured that the fed parts are not damaged or deformed through sorting or separating brushes or devices (for example, in particular twisting of seals is not permissible).

In general brushes without bristles have to be used. In that case it’s possible to use cloth (for example Eladur etc.). The metal parts of the brushes are not allowed to roam at the conveyor, covers or anything else.

4 Spiral conveyor technology

Spiral conveyors are to be designed so that transport of the bulk material is always ensured, i.e. the bulk material may not remain wedged or hanging in pneumatic transport nozzles, locking pins, etc.

Spiral conveyors are to be equipped with a quick emptying system. The quick discharge mechanism must be attached to a position on which the bulk material does not have to pass any locks during emptying, which allows for efficient, fast and complete emptying.

During emptying, the bulk material must be filled into a container defined by the client (usually the container which transfers the bulk material to the machine).

The lock of the quick emptying system must be secured against loss.

Spiral conveyors are to be equipped with moving/removable and see-through Polycarbonate covers, which prevents accidental insertion and ejection of bulk materials. The cover must be designed ergonomically and suitable for both right- and left-handed people. A stop must be available for the cover.

Spiral conveyors (pot) which transport unclean bulk materials, such as seals (oozing silicon) must be designed so that they can be assembled and disassembled via a quick-change system. Fine adjustment of the spiral conveyor may not take place after assembly and disassembly.

Good access to the spiral conveyor must be ensured for cleaning work.

The filling height of the spiral conveyor must be checked if a bunker is present. If the filling level is too low, a warning message is to be output. Warning messages are explained further in the Warning Messages chapter.

The fill level height of the spiral conveyor is to be controlled with a sensor.

The fill height of the spiral conveyor may be a maximum of 1200 mm.

Spiral conveyors should (if possible) have openings or recesses for contamination to fall-through.

Spiral conveyors must be adjustable by at least 5 mm in all directions.

Spiral conveyors which are filled manually are to be permanently labelled with a maximum fill level indicator.

All sorting blower air nozzles must be switched on/off during non-use (bunker section full, pot turned off, etc.) via a time-controlled valve.

It is to be ensured that, for example through sorting brushes, whisks, Eladur or separating stop, the fed parts are not damaged or deformed (e.g. in particular rotation of the seals is not permitted).

5 Linear conveyor technology

The linear feeder must be designed so that loss of bulk material is excluded.

Linear feeder must be equipped with a quick emptying function. This could take place as manual emptying by pushing the bulk material (without the bulk material blocking) in the spiral conveyor as well as automatically via a separate opening in the linear feeder.

In the variant with a separate opening, make sure that during emptying the bulk material is filled into a container defined by the client (usually the container which transfers the bulk material to the machine). The lock of the quick emptying system must be secured against loss.

Linear feeders (transport rails) which transport unclean bulk materials, such as seals (oozing silicon) must be designed so that they can be assembled and disassembled via a quick-change system.

Fine adjustment of the linear feeder may not take place after assembly and disassembly.

Good access to the linear transport rails must be ensured for cleaning work.

Linear feeders should (if possible) have openings or recesses for contamination to fall through.

Linear feeders must be adjustable by at least 5 mm in all directions.

The covers of the linear feeder are to be attached with wing nuts or thumbscrews to enable removal without tools. This should only be removable by loosening the wing nuts or thumbscrews. Fine adjustment of the covers may not take place after assembly and disassembly.

6 Bunkers and slanting bunkers

Bunkers are to be chosen or designed so that they always deliver the required quantity of bulk material. Designs or materials are to be used which have no deformations, wear etc.

Bunkers must be equipped with a quick emptying system. The rapid emptying must be installed at a position where the bulk material can be emptied completely.

During emptying, the bulk material must be filled into a container defined by the client (usually the container which transfers the bulk material to the machine).

The lock of the quick emptying system must be secured against loss.

Bunkers are to be equipped with moving/removable and see-through Makrolon covers, which prevents accidental insertion and ejection of bulk materials. The cover must be designed ergonomically and suitable for both right- and left-handed people.

The fill height of the bunker may not exceed 1400 mm.

The filling opening of the bunker must be dimensioned so that it can be filled directly from the container in which the bulk material is provided to the machine, without bulk material leaking next to the bunker.

The fall section of the bulk material from the bunker is to be clad with Polycarbonate, so that a precise transfer of the bulk material to other peripheral devices is guaranteed. The cladding of the fall section may not be glued.

The falling distance from the bunker into the pot must also be covered with Polycarbonate.

7 Reel / unwinder / coils

The use of pneumatic drives for reels, unwinders and coils is not desired. The spools of the belted goods must be easy to replace.

Depending on the change interval, a lifting device is necessary if the spool or coils are more than 15kg.

Hirschmann Automotive must be notified of the start and end of the strip goods that cannot be processed

The belted goods may not be under tension, but must hang contactless between spools and the guided holder for further processing. Contactless level regulation is to be provided.

Winding and unwinding with a reel (spool/ coil) must take place regardless of machine cycle. Signalling may only be actuated without contact, e.g. via sensor or light barrier.

A button must be located on the reel which allows manual winding and unwinding.

The end of the belt may never fall on the floor or other belt which lies ready. It must be caught in a chrome steel tray. It should not matter whether the belt end is glued to the spool (belt stretching) or is loose on the spool (wound up backwards).

The entire belt section must be encased on the sides with Polycarbonate. The cover must run at least 50 mm over the maximum upper and lower position of the belt. With belts where the surface plays an important role for further processing (e.g. soldering) a removable cover must also be mounted.

Intermediate layers (e.g. paper) are to be rolled up with a winder. The torque and/or rotational speed must be designed to be adjustable.

For components with different quality characteristics, such as surface, press-fit inner bearings, etc. these zones must be exempted for the entire processing.

The reel must recognise the lower and upper level, the length of the belt and the end of the belt.

8 Conveyor technology for belted goods

8.1 Autonomy

The autonomy of spools is automatically given by the packaging quantity and the cycle time. The contractor has no influence here.

8.2 Chads

Punch remnants must be disposed of in a waste bin. These waste bins must be fixed in their positions.

9 Preferred components

9.1 Feeding systems

Feeding systems of the supplier AFAG have to be used in the case of feeding seals.

9.1.1 Desirable Suppliers

- AFAG
- RNA

- GRIMM
- NAK
- Ohrmann

10 Transfersysteme

In the case of transfer systems, the following points must be taken into account.

- Stable construction, torsion-resistant
- Ground mounting
- Lateral guidance
- The design of the excavation unit must be coordinated with Hirschmann Automotive
- Conveying speed
- Stopper designed for conveying speed
- Access to closed loops/tape sections possible via gates
- Maintenance accessibility (changing belts, rollers, sensors)
- Technical cleanliness – abrasion, signs of wear

10.1 Workpiece carriers / pallets

In the case of workpiece carriers and pallets, the following points must be observed.

- Numbering
- Coding (RFID, status control,)
- Easily replaceable
- Easy to clean (technical cleanliness)
- Poka Yoke safe handling
- Material must be chosen in such a way that it can withstand continuous operation.
- Weight
- Low maintenance (replacement of wear parts)
- For manual operation, it must be designed in such a way that it cannot cause injury to the employee. (Chamfers, radii, pinch points)

11 Palettering system

11.1 Palettering system

In the case of palletizing systems, the following points must be taken into account.

• Stable construction

• Connection to the machine

• Ergonomic loading and unloading

- Trolley Poka Yoke safe insertion
- During operation, there must be no damage or distortion to the blister/tray
- There must be no contamination or abrasion during operation
- Maintenance accessibility

11.2 Blister / Trays

It should be checked whether the blisters/trays are inserted in the right position.

The stacking system is to be designed so that the single parts can be fully removed from the warehouse without being damaged.