

General Terms and Conditions - Technical Part

1 - The customer agrees that the 5 mm required by Standard DIN EN 619:2011-02 as gap dimension from conveyor to conveyor cannot be respected due to technical reasons. Deviations from this standard do not constitute a deficiency and are therefore excluded from any claim. Additional measures are not integral part of this contract.

General Remarks

The present document describes the safety review at the transition from conveyor to conveyor.

The description below reveals that it is not possible to reduce the gap between two conveyors to less than a theoretical value of 5 mm owing to the circulating chains (polygon effect).

In the following we will explain why there will not be any physical pull-in.

First of all it needs to be mentioned that this standard was once determined because belts running with sufficient surface roughness over a round body develop a sufficient form fit connection between finger and rotating unit which causes a continually increasing pull-in force.

In the present case, however, of Dücker conveyor systems GmbH (subsequently called Dücker) link chains are concerned which are running around a shaft like a rotating polygon. So the body which moves in the gap does not suffer from form-fit pull in to which the original standard refers. Contrary to the round body with belts there is a pulsatile movement. Due to this physical marginal condition it cannot be compared to the predetermined norm.

In the Corrugated Board Industry the utilisation of link chains prevailed over the utilisation of roller conveyors. Talks with the trade association confirmed that the accident rates decreased extremely since the utilisation of link chains.

Our operating manuals show clearly that it is as a matter of fact not allowed to access the conveyors with the exception of those that are real working places.

Provided that the Material Handling System is utilized correctly and that the personal protective equipment is used the hazardous zones are low.

There is a regular exchange between the company Dücker and the trade association in order to continuously improve its products and to make them safer.

The plastic chain conveyors of the company Dücker conveyor systems GmbH are no working places that means that nobody shall stay there during operation. Our operating manuals show clearly that it is as a matter of fact not allowed to access the conveyors with the exception of those that are real working places.

Extract of our Operating Instructions:



⚠ WARNING

**In automatic mode, conveyors start running immediately.
There is a risk of collision with the transported material.**

Only instructed persons may work on work stations of the conveyor system.

Works may only be carried out in a safe position.

Any works on signal transmitters during system operation are strictly forbidden.

► After repair works, check the functions of the safety devices.

Additional information is to be found in our documentation.

Explanation

The risk assessment describes referring to the transition point the pull-in point between two conveyors with circular chain.

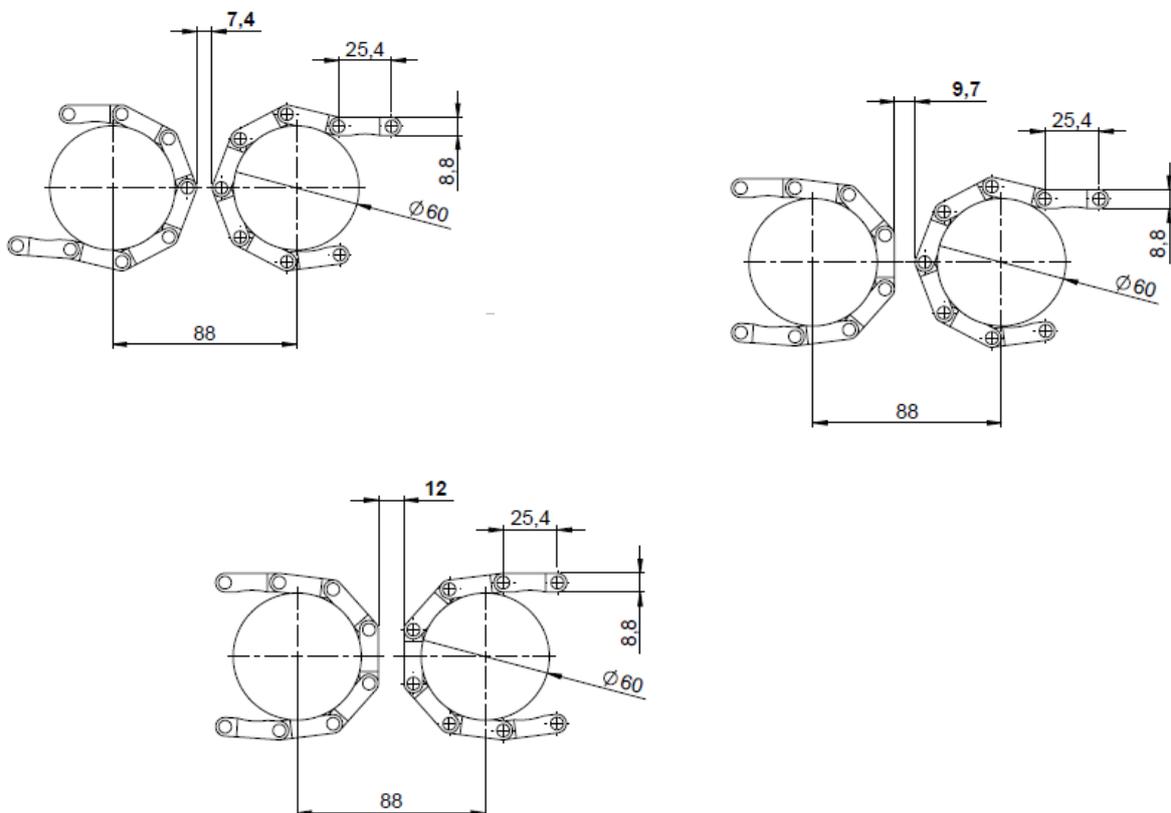
According to the DIN EN 619 there is the requirement that the gap dimension shall not exceed 5 mm.

A. The general angle tolerances of conveyors are $\pm 1,5$ mm according to the conveyor width. Due to this there is a maximum and minimum dimension of - 3 mm or + 3 mm if two conveyors are put next to each other.

B. The polygon effect of a one inch chain of a reel with a diameter of 60 mm varies at each side around 2,3 mm. Due to this there is a minimum distance of 4,6 mm.

Cumulated the tolerances of angle precision and the polygon effect exceed the required 5 mm.

With regard to designing the transition between two conveyors with one axis-center distance amounts to 88 mm. Due to this we achieve minimum distances between 7,4 and 12 mm. Due to the manufacturing tolerances and the polygon effect as described underneath point A and B the minimum distances vary between 4,4 and 15 mm and are thus extremely above the ones required by the norm DIN EN 619 of 5 mm.



Bumpers such as triangular bodies or intermediate plates are not a designing solution because here we also have a distance that exceeds 5 mm as described underneath A and B.

Pull-in tests

Due to these technical framework requirements Dücker regularly carries out and documents pull-in tests at conveyors.

Instead of a finger Dücker utilizes different objects as replacement object. Synthetical objects such as smooth plastic are used as well as organic objects such as carrots.

The tests are always carried out in a way to ensure that the objects are pushed with pressure into the gap in order to verify if they are pulled- in.

All tests proved that none of the objects neither the organic nor the synthetical even in combination with gloves of different quality (cotton tricot, nylon fine knit with PU-coat, cotton knit with PU-coat) caused a finger to be pulled-in.

Result

Provided that the conveyors are not operated in opposite direction which is guaranteed due to the control technology there is no pull-in zone but only a pinch point.

Due to the smooth surface of the utilized material (plastic chain) and the polygon effect the “pinch point” has a pulsating movement which does not cause the limbs (for instance finger) to be pulled-in a form-fitting way.

As described above the gap dimension required by the norm cannot be realized in a reasonable technical way due to the technical circumstances. In addition, in the context of risk assessment you do not get performance data relating to “frequency, prevention, gravity” that should have to classify the hazardous situation. It is therefore not absolutely necessary to install a protective element.

2 - The customer acknowledges that the realization of the operating elements complies with the norm DIN EN 60204-1(VDE0113-1):2014-10. This also applies to the selection of the colour code. It complies with the norm. Deviations or interpretations from this norm do not constitute a deficiency and are therefore excluded from any claim.

3 - The customer acknowledges that the non-use of error current protect switches is not an infringement of the norm. The technical installations are realized in a way to ensure that the norms DIN VDE 0100-410 and DIN EN 50178 (VDE0160) concerning the utilisation of error current protect switches cannot be applied. At the same time the customer acknowledges that when utilizing frequency converters an appropriate utilisation of error current protect switches is not possible. The non-utilisation of error current protect switches does not constitute a deficiency and is therefore excluded from any claim.

4 - The customer acknowledges that the insulation test for the initial installation does not belong to the scope of supply of this quotation. The customer has to explicitly order such an insulation test of the installation in the final state and this order is independent from the proper order. An insulation test in the business rooms of the customer cannot be carried out without the risk of an electro technical damage of the existing components. It is not possible to exclude such a risk of components that are customer property or have been utilized by a customer order or which are during the test in the area of the electrical measurement. We exclude all compensation claims or claims to exchange components or all other claims that have been caused due to the insulation test.

Independently of the costs to order an insulation test the enclosed order form of Dücker conveyor systems GmbH has to be used in any cases.

Insulation test order

Initial and Periodic Testing of Electrical Systems				
No.	Sheet of	Customer no.: / Project no.:		
Customer:	Order no.:	Contractor:		
		Dücker conveyor systems GmbH Ernst-Telling-Strasse 13 D-40764 Langenfeld		
Installation:		Test has been carried out by:		
Test according to: <u>DIN VDE 0100-600</u> <input type="checkbox"/>		<u>DIN VDE 0105</u> <input type="checkbox"/>	<u>DGUV-V3</u> <input type="checkbox"/>	<u>DIN VDE 0113</u> <input type="checkbox"/>
<u>New plant</u> <input type="checkbox"/>	<u>Extended plant</u> <input type="checkbox"/>	<u>Modification</u> <input type="checkbox"/>	<u>Maintenance</u> <input type="checkbox"/>	<u>Repeat test</u> <input type="checkbox"/>
Supply: ____ / ____ V ____ Hz Power system: <u>TN-C</u> <input type="checkbox"/> <u>TN-S</u> <input type="checkbox"/> <u>TN-C-S</u> <input type="checkbox"/> <u>TT</u> <input type="checkbox"/> <u>IT</u> <input type="checkbox"/>				
Distribution system operator:				

Instruction

The customer knows the risks of an insulation test in the plant environment. He ensured or will ensure in order to carry out the insulation test that in the environment of the insulation measure no components are used or operated that may be damaged in the context of an insulation test.

I have understood the technical explanations and terms and conditions and accept them. In particular I acknowledge the points described under 2 to 4.

Place

Date

Signature