Drop Test Comparison For New and Current TO-252 Reel

GOBM Tommy TAO

Drop test for Current Vs New Reel

Drop test 1

1.Purpose

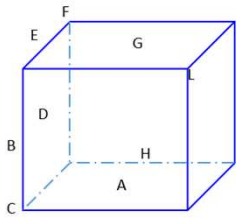
Verify current and new reel meet STM spec(doc no:7416802)

2.Scope

This evaluation applies to TO-252 product in inner box and outer box

3.Condition:

height (mm)	Figure	Test position
1200	Figure 1	Face A 、Edge B、Corner C
	Figure 2	Face D 、Edge E、Corner F
	Figure 3	Face G 、Edge H、Corner L



4. Procedure

a. Lift the test package and hold it in the predetermined attitude and height

b. Loose hand and make the product to free fall to the ground

c. Inspect reel & products after dropping

5. Conclusion

After drop test , both reel all pass with 7416802 spec.

Result	Box	Drop height	Follow STM spec requirement
Current	Outbox	1200mm	Pass
New	Outbox	1200mm	Pass
Current	Inner box	1200mm	Pass
New	Inner box	1200mm	Pass

life.augmented

Drop test for Current Vs New Reel

Drop test procedure defined in STM spec(doc no:7416802)

7 PROCEDURES

7.1 Frequency: The tests must be carried out for the qualification of a new supplier and/or type of packing material.

7.2 Method of the execution:

7.2.1 Number of test specimens: Three test specimens (one for each of the three trials as described in

7.2.2 Area of impact: The area of impact must be a surface rigid, plain, smooth and horizontal

7.2.3 Height of drop: The box under test must be dropped from an approximate height of 120 cm, equivalent to the height typical for the manual transportation.

7.3 Execution and result of the tests:

7.3.1 Before the drop, the samples for the tests must be held in such a manner that their center of gravity is approximately situated on the vertical of the impact point.

7.3.2 Description of test: This test described below applies to drop tests done on the outer box.

Drop test for Current Vs New Reel

Drop test procedure defined in STM spec(doc no:7416802)

7.3.2.1 First specimen of test. Box under test is to be placed in position as indicated in Fig. 2.

a) First drop: flat on the bottom (see fig.1 / A)
b) Second drop: on an edge (see fig. 1 / B)
c) Third drop: on an angle (see fig. 1 / C)

7.3.2.2 Second specimen of test: Box under test is to be placed in position as indicated in Fig 3.

a) First drop: flat on a longitudinal side (see fig.1 / D)
b) Second drop: on a longitudinal edge (see fig. 1 / E)
c) Third drop: on an angle (see fig. 1 / F)

7.3.2.3 Third specimen of test: Box under test is to be placed in position as indicated in Fig 4.

a) First drop: flat on a transversal side (see fig.1 / G)
b) Second drop: on a transversal edge (see fig. 1 / H)
c) Third drop: on an angle (see fig. 1 / I)

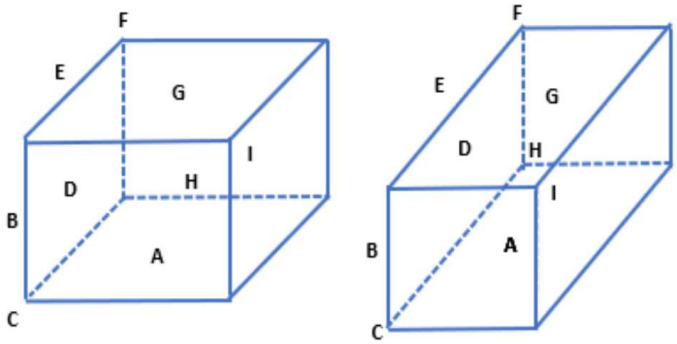
7.3.3 In the case of a drop test performed on the inner box, the methodology is the same as that described in 7.3.2.1 to 7.3.2.3 above. The drop tests are however performed on three specimens of inner box each filled with devices. The faces of the box remain as those shown in Figure 1.

life.augmented

Drop test for Current Vs New Reel

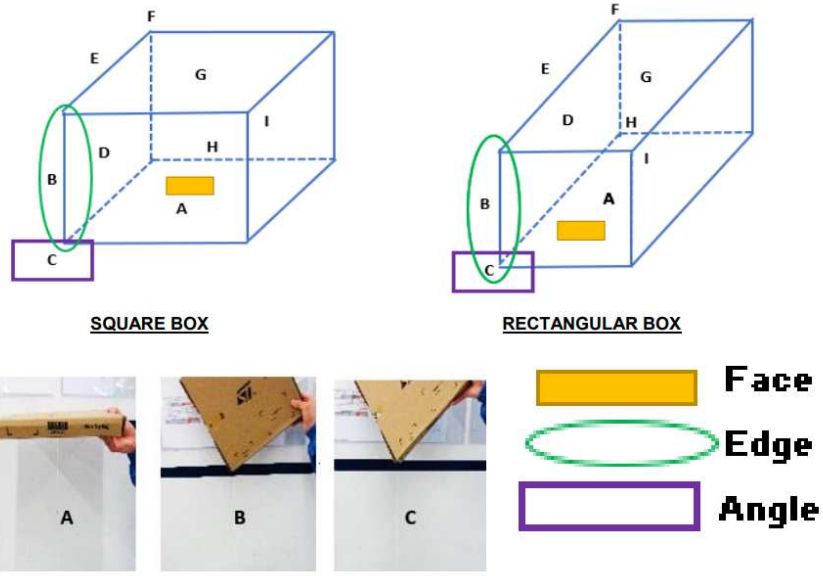
Drop test procedure defined in STM spec(doc no:7416802)

FIGURE 1



SQUARE BOX RECTANGULAR BOX

Figure 2: Box position for drop test on Face A, Edge B and Corner C.(Refer as well to sample Box picture)

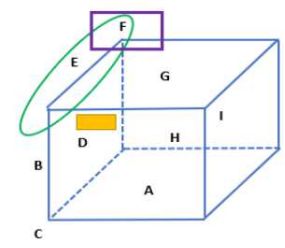


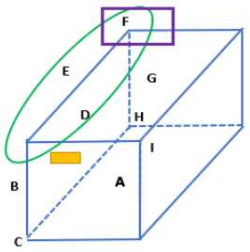
SQUARE BOX RECTANGULAR BOX

Drop test for Current Vs New Reel

Drop test procedure defined in STM spec(doc no:7416802)

Figure 3: Box position for drop test on Face D, Edge E and Corner F





SQUARE BOX **RECTANGULAR BOX**

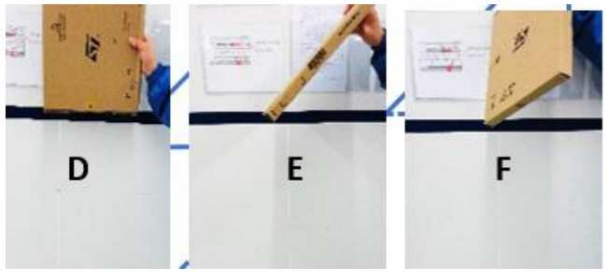
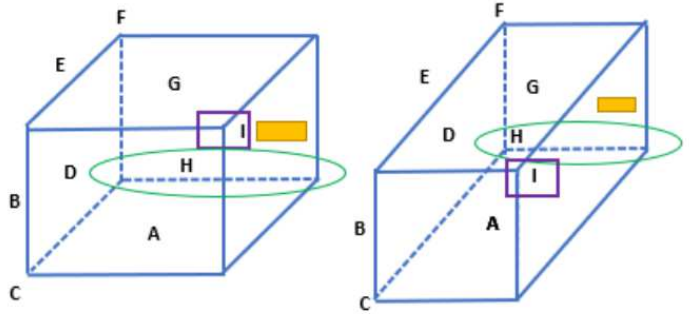
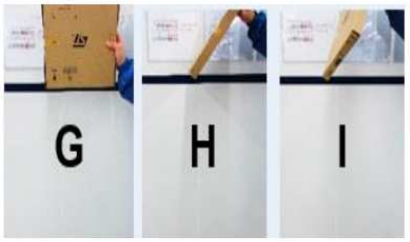


Figure 4: Position of inner box for drop tests on Face G, Edge H and Corner I.



SQUARE BOX **RECTANGULAR BOX**



Our technology starts with You

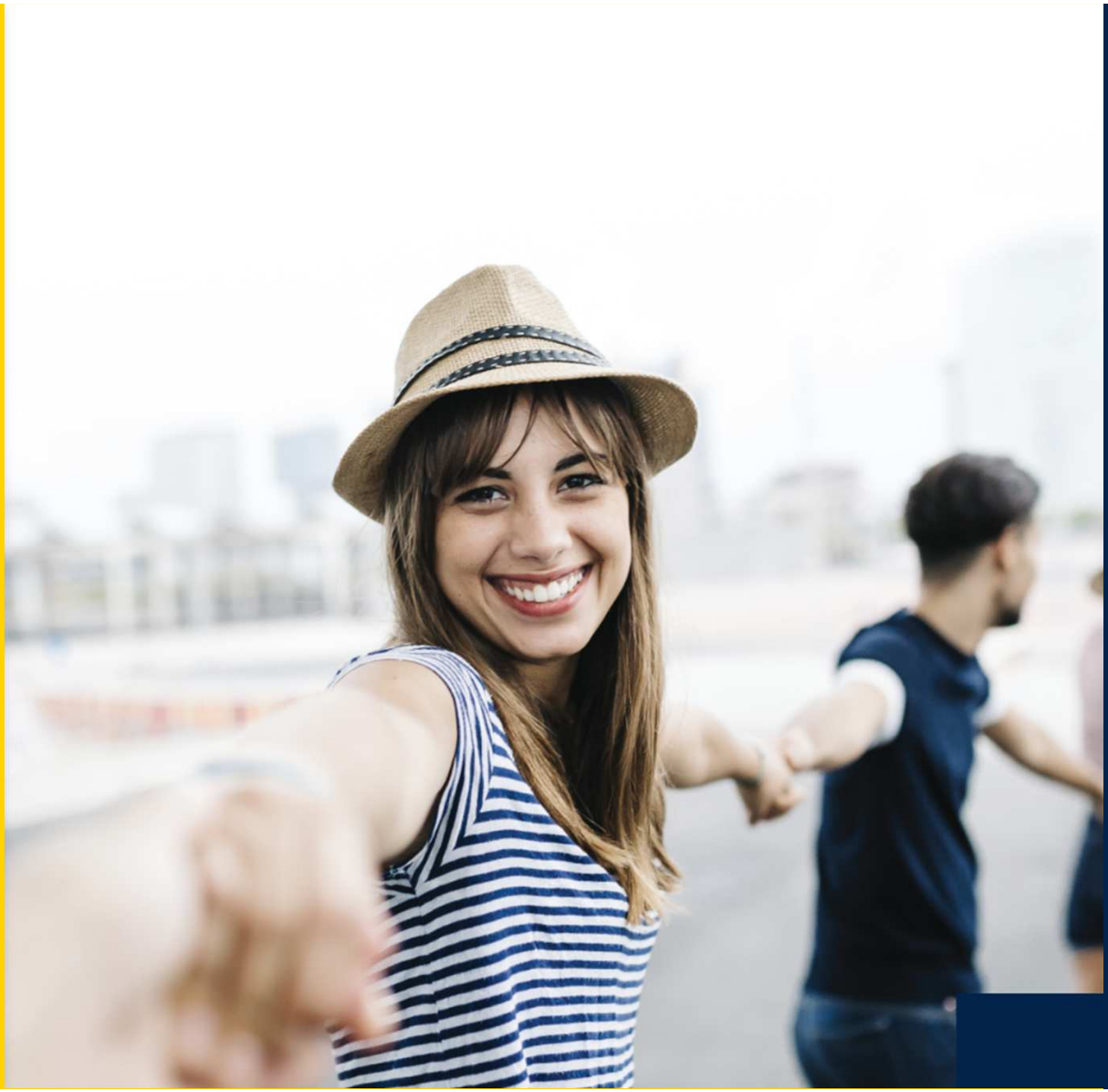
Find out more at www.st.com

life.augmented

For further support in creating a PowerPoint presentation, including graphic assets, formatting tools and additional information on the ST brand

you can visit the ST Brand Portal

https://brandportal.st.com

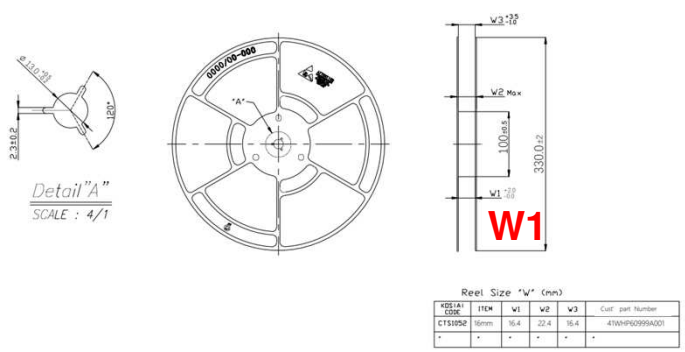


life.augmented

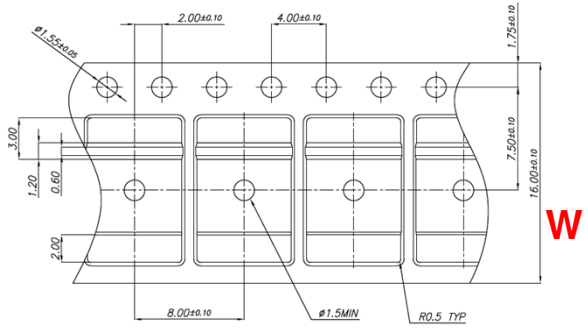
Jamming Assessment

GOBM Tommy TAO

Drawing design assessment



Reel drawing



Carrier tape drawing

The lower limit of reel width(W1) is 16.4mm.
The upper limit of carrier tape width(W) is 16.1mm.
So, there is no jamming risk even at the limit condition.

life.augmented

Winding and unwinding test

Winding test

Procedure :
1)Prepare 5ea current reels and 5ea new reels.
2)Winding the tape into reel in order by handler.
3)Monitor the winding status.
Result:

	Current reel
Sample 1	No jamming
Sample 2	No jamming
Sample 3	No jamming
Sample 4	No jamming
Sample 5	No jamming

	New reel
Sample 1	No jamming
Sample 2	No jamming
Sample 3	No jamming
Sample 4	No jamming
Sample 5	No jamming

Unwinding test

Procedure :
1)Prepare 5ea current reels and 5ea new reels with carrier tape.
2)Unwinding the tape out of reel in order on FVI workbench.
3)Monitor the unwinding status.
Result:

	Current reel
Sample 1	No jamming
Sample 2	No jamming
Sample 3	No jamming
Sample 4	No jamming
Sample 5	No jamming

	New reel
Sample 1	No jamming
Sample 2	No jamming
Sample 3	No jamming
Sample 4	No jamming
Sample 5	No jamming

life.augmented

Our technology starts with You

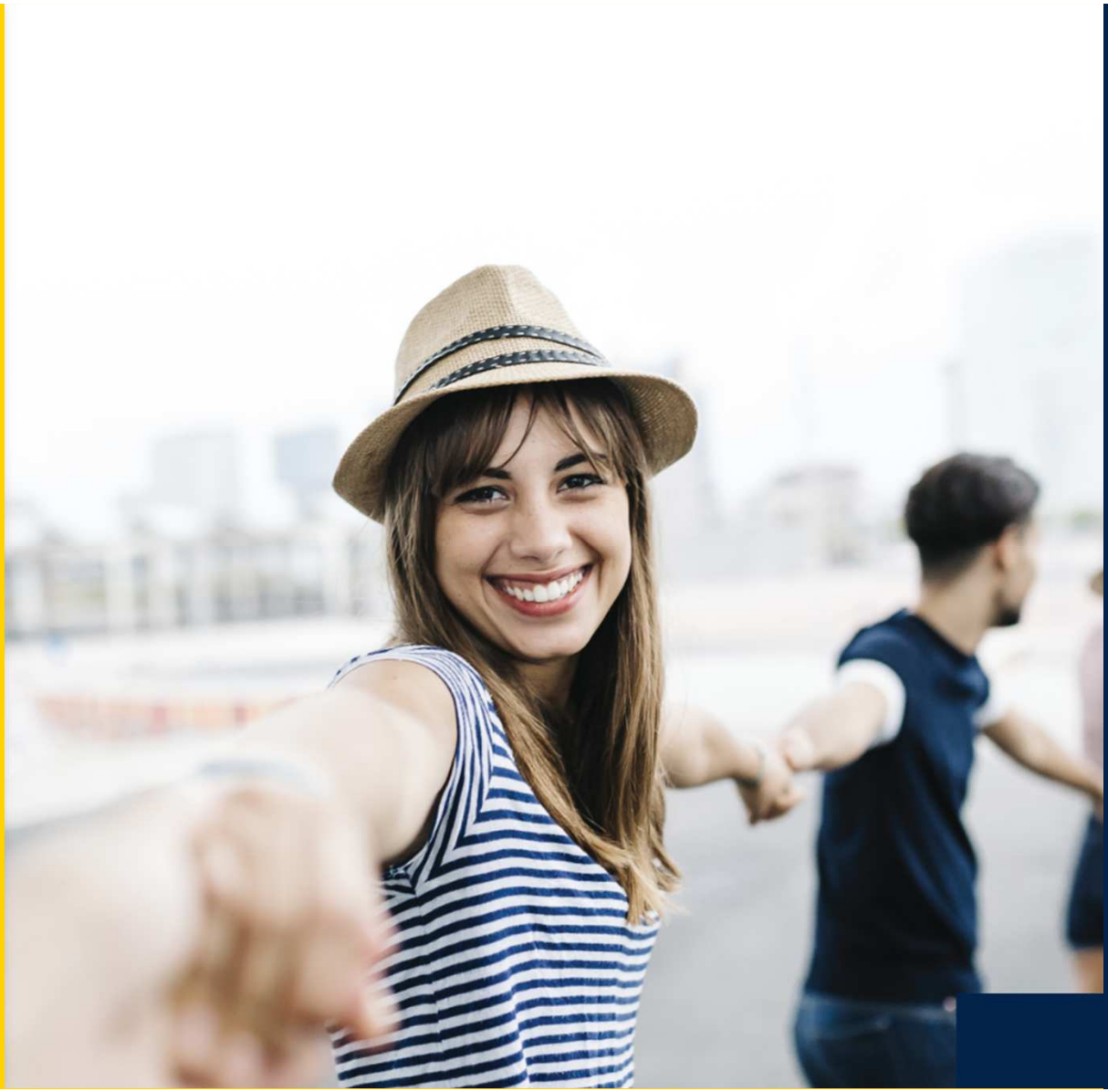
Find out more at www.st.com

life.augmented

For further support in creating a PowerPoint presentation, including graphic assets, formatting tools and additional information on the ST brand

you can visit the ST Brand Portal

https://brandportal.st.com



life.augmented

life.augmented

PRODUCT / PROCESS CHANGE INFORMATION

PCI – ATX Wei Hai* – Qualification of Reel Design Change for STM DPAK TO-252 Devices

*: ATX Wei Hai formerly known as ASE Wei Hai

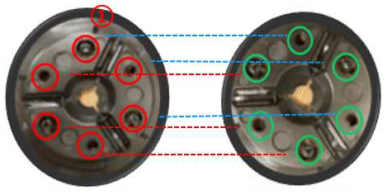
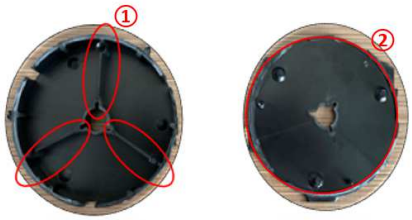
What is the change?

Current Condition:

Reel used for DPAK TO-252 devices **fixed pin** at hub to bond reel.

Proposed Condition:

Reel used for DPAK TO-252 devices **welding** at hub to bond reel.

Current reel (Fixed pin at hub)	New reel(Welding at hub)
	
① Hub connect by fix pin	① Hub have 3 stiffener ② Hub connect by side welding

Why?

The main benefits are:

This change is for quality continuous improvement to have robust reel protection and enhance the reel strength by redesign.

When will this change occur?

The change will be implemented at the end of Dec'22.

How will the change be qualified?

Perform drop test, jamming assessment and dimension comparison between current reel and new design reel. (**Refer to Qualification Plan**).

What is the impact of the change?

- Form: No change on product
- Fit: No change on product
- Function: No change on product
- Reliability, or Processability: No change on product.

APPENDICES:

APPENDIX 1 Risk Assessment

APPENDIX 2 Qualification Plan

APPENDIX 3 Qualification Results

APPENDIX 1: RISK ASSESSMENT

Change Risk Assessment				
Category	**S/N**	**Risk Description**	**Risk Level (H/M/L)**	**Risk Mitigation Plan Description**
Change to process	1	Wrong information on Lot card	L	Engineer setup new packing part No. on the Lot card and other engineer pre-view information on Lot card is correct by device
	2	Wrong reel used	L	Follow Lot card information to take new packing material, training operator double check follow with Lot card and FVI operator double check it
Change to material	3	Carrier tape jamming in reel	L	1. Size comparison for carrier tape and reel design 2. IQA sample check received reel dimension 3. Operator monitor reel rolling status with carrier tape

APPENDIX 2: QUALIFICATION PLAN

1. Perform drop test 1 to verify current reel and new reel whether meet STM spec 7416802.

2. TO-252 reel dimension measurement comparison to check the gap between current reel and new reel, and to check whether meet STM spec 0084694.

3. Perform jamming assessment by winding and unwinding test:
    a. Total 5ea current reels and 5ea new reels per test.
    b. Wind the tape into reel in order by handler.
    c. Unwinding the tape out of reel in order on FVI workbench.

APPENDIX 3: QUALIFICATION RESULTS

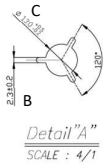
1. Drop test 1 is passed.

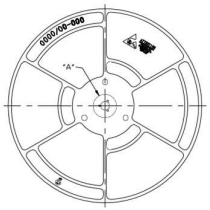
Drop Test Result.pptx

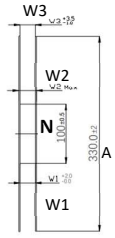
2. New reel meets ST spec and has little gap compared with current reel. (Difference is marked in red)

ITEM NO.	A	N	W1	W2	W3	C	B
Current Reel	330 ± 2.0	100+2.0/-0.5	17.65+1.75/-0.75	22.4MAX	17.65+3.5/-1.0	13.0+0.5/-0.2	1.5min
Sample1	330.40	100.35	17.21	21.22	17.42	13.13	2.15
Sample2	330.50	100.55	17.30	21.34	17.51	13.21	2.13
Sample3	330.50	100.40	17.11	21.10	17.29	13.19	2.19
Sample4	330.30	100.21	17.22	21.22	17.40	13.20	2.16
Sample5	330.00	100.10	17.25	21.25	17.41	13.22	2.13
Result	PASS	PASS	PASS	PASS	PASS	PASS	PASS

ITEM NO.	A	N	W1	W2	W3	C	B
New Reel	330 ± 2.0	100 ± 0.5	16.4+2.0/-0.0	22.4MAX	16.4+3.5/-1.0	13.0+0.5/-0.2	2.3 ± 0.2
Sample1	330.50	100.31	16.79	20.86	16.92	13.26	2.21
Sample2	330.40	100.25	16.93	20.95	17.21	13.38	2.29
Sample3	330.40	100.13	16.74	20.81	16.90	13.39	2.30
Sample4	330.30	100.26	16.88	20.92	16.98	13.41	2.31
Sample5	330.20	100.11	16.69	20.77	16.90	13.32	2.22
Result	PASS	PASS	PASS	PASS	PASS	PASS	PASS







Reel Size "W" (mm)

KOSTAT CODE	ITEM	W1	W2	W3	Cust' part Number
CT33052	16mm	16.4	22.4	16.4	4IWHP60999A001
-	-	-	-	-	-

3. No jamming happened.

Jamming Assessment.pptx

Conclusion

1. Qualification results are positive.
2. In the dimension comparison, W1 and W3 have a gap and narrower than current reel. They are related to rolling status with carrier tape.
   After jamming simulation, no risk for W1 and W3 dimension gap.
3. In the dimension comparison, the range of B has changed. It is related to reel placed in the machine.
   Due to gap of sample check is close and both can fix in the machine, no risk for B dimension gap.