

## RE: 回复: 关于10M晶体老化不良问题

**Wei Zhang**

发给 sqe@dptel.com, Mueller, Luke, jian.tang

2019-02-26 06:22 [详细信息](#)

Jesse,

We have reviewed your aging data. Our interpretation of your data is as follows:

1. Dapu tested 12743 pcs crystals aging for 10 to 12 days
2. Dapu considered 556 pcs out of these 12743 pcs failed aging
3. Your total data include 253 pcs test crystals.
4. After Croven analysis, there are 22 pcs from 253 pcs crystals with total frequency change greater than 10 ppb after 12 days aging. These crystals are clear aging reject and will possibly fail  $\pm 50$ ppb/yr spec
5. So we guess proportionally there are about 50 pcs out of all the 12743 pcs with frequency change greater than 10 ppb after 12 days aging.
6. The rest of crystals in your aging data should meet  $\pm 50$ ppb yearly aging based on aging projection
7. TEMPH900226 spec only specifies aging rate  $\pm 50$  ppb/yr. From attached aging curves in total data file, there are frequency jumps on curves which we are not sure about the root cause yet. They could be due to aging test system, other components of your OCXO circuitry such as faulty inductor or crystals. Although micro-jumps are not part of the Dapu spec, but Croven strives to improve the micro-jump problem and will help Dapu to analyze the problem.

In addition, in your aging data, you attached 19 pictures of aging curves. If you look closely, the curves in each graph all have sudden large frequency shift for all curves together in the same graph at points as below:

Graph	Large frequency shift for all curves together in the same graph
1	Point 166
2	Point 167
3	Point 166
4	Point 165
5	Point 166
6	Point 166
7	Point 165
8	Point 165
9	Point 165
10	Point 165
11	Point 192 all Curves age negatively with very similar slop

12	Point 192 all Curves age negatively with very similar slop
13	Point 94
14	Point 160
15	Point 160
16	Point 160
17	Point 101
18	Point 100
19	Point 100

These seem to show your aging test system have some systematically introduced errors which have contributed to aging problems. Please review your test system and ensure they are not causing false aging failure.

Thank you.

Wei Zhang  
Crystal Engineer  
Croven Crystals  
Wenzel International, Inc.

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**From:** sqe@dptel.com [mailto:sqe@dptel.com]  
**Sent:** February-21-19 6:58 AM  
**To:** Wei Zhang; Mueller, Luke  
**Cc:** jian.tang  
**Subject:** 回复: 回复: 关于10M晶体老化不良问题

张工：

你好，关于10M晶体老化不良问题，贵司是否已查阅完数据，我们计划将退回一些不良品给Croven分析，尽快解决老化不良的问题，请告知我您的意见，谢谢！

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**Dapu Telecom Technology Co.,Ltd**

**Contact person: Jesse(唐佳)**

**Tel : 0769-88010888-886**

Phone:18814332206

Email: [sqe@dptel.com](mailto:sqe@dptel.com)

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发件人: [sqe@dptel.com](mailto:sqe@dptel.com)

发送时间: 2019-02-15 17:02

收件人: [wzhang](mailto:wzhang); [Luke Mueller](mailto:Luke Mueller)

主题: 回复: RE: 关于10M晶体老化不良问题

张工:

你好, 我们的老化测试是一个小时采集一次数据, 也就是每个产品间隔一个小时读取数据。请知晓!

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**Dapu Telecom Technology Co.,Ltd**

Contact person: Jesse(唐佳)

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发件人: [Wei Zhang](mailto:Wei Zhang)

发送时间: 2019-02-13 23:51

收件人: [sqe@dptel.com](mailto:sqe@dptel.com); [Mueller, Luke](mailto:Mueller, Luke)

主题: RE: RE: 关于10M晶体老化不良问题

Thanks for the clarification. But what's the time for the "typical passed data" file. Is it also 1 hour per measurement?

Wei Zhang  
Crystal Engineer  
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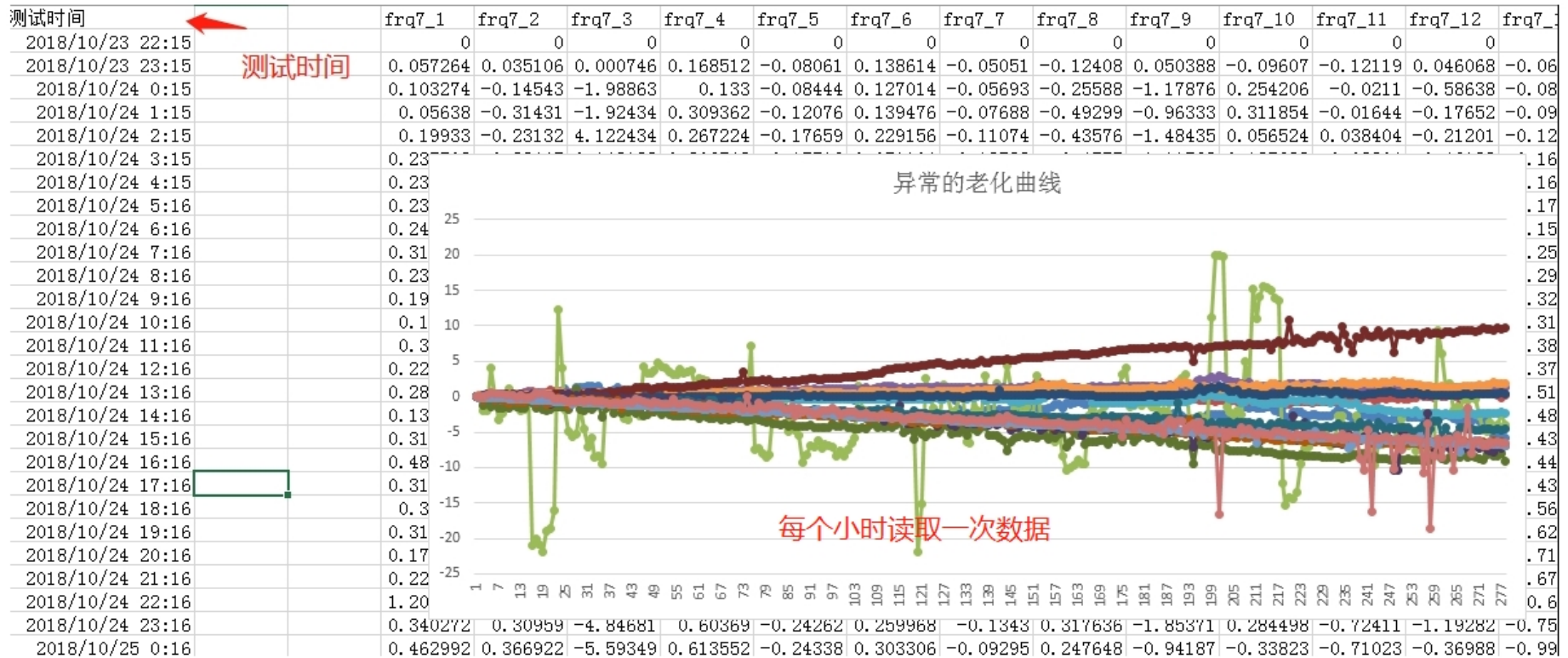
Fax: 905-668-5003

email: [wzhang@crovencrystals.com](mailto:wzhang@crovencrystals.com)

From: sqe@dptel.com [mailto:sqe@dptel.com]  
 Sent: February-13-19 10:28 AM  
 To: Wei Zhang; Mueller, Luke  
 Cc: 晶体采购; guohua.cheng; ling.tong; wangcm; jian.tang  
 Subject: 回复: RE: 关于10M晶体老化不良问题

张工：

你好，附件典型不良的老化数据中有测试时间，横轴增加了时间，一小时采集一个数据，请确认，谢谢！



Dapu Telecom Technology Co.,Ltd

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发件人: [Wei Zhang](#)

发送时间: 2019-02-13 22:54

收件人: [sqe@dptel.com](mailto:sqe@dptel.com); [Mueller, Luke](#)

抄送: [????](#); [guohua.cheng](mailto:guohua.cheng); [ling.tong](mailto:ling.tong); [wangcm](mailto:wangcm)

主题: RE: 回复: 关于10M晶体老化不良问题

Jesse,

Data in your attached file still does not have the time stamp of each measurement. Horizontal axis still shows no unit between each data point. Please add time into your data. Thanks

Wei Zhang

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**From:** [sqe@dptel.com](mailto:sqe@dptel.com) [<mailto:sqe@dptel.com>]

**Sent:** February-13-19 9:40 AM

**To:** Wei Zhang; [Mueller, Luke](#)

**Cc:** 晶体采购; [guohua.cheng](mailto:guohua.cheng); [ling.tong](mailto:ling.tong); [wangcm](mailto:wangcm)

**Subject:** 回复: 回复: 关于10M晶体老化不良问题

张工:

你好, 在以下2019年1月25日邮件中, 我向Croven提供了晶体老化率不良测试数据, 请协助确认老化率不良的原因, 是否需要退回不良品给Croven分析?

我们希望尽快解决这个问题, 谢谢!

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Dapu Telecom Technology Co.,Ltd

Contact person: Jesse(唐佳)

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Phone:18814332206

Email: sqe@dptel.com

Address: BLDG16,Northern industrial Zone,SSL Sci & Tech Industry Park ,DongGuan,GuangDong,China 523808

发件人: sqe@dptel.com

发送时间: 2019-01-25 23:45

收件人: wzhang; Luke Mueller

抄送: 晶体采购; guohua.cheng; ling.tong; wangcm

主题: 回复: RE: 关于10M晶体老化不良问题

张工:

你好, 以下是关于TEMPH900226 ( 10M ) 晶体老化不良的相关信息回复, 请查看, 并协助回复原因, 谢谢!

1. Provide time stamp of your aging data. Your data do not have time interval between each measurement so we can't use it to calculate aging.  
老化测试时间已增加在附件中。
2. Provide aging failure rate from each previous shipment. This will help to find the trends of aging performance over time of each batch to gauge when the aging problem start and how significant the problem is.

以下是根据使用批次与Croven批号对照, 由于晶体已经使用在产品中, 且产品会使用多个批次的晶体, 无法确定不良晶体对应的批次号。

工单号	投产数量	不良数量	不良率	使用晶体数量	使用的晶体批次	Croven批次号	来料数量
131803202-2	3218	116	3.60%	2	20180601003	20180523	195
				6	20180710020	20180706	1506
				1479	20180710023		
				402	20180622025	20180615	2570
				1329	20180704035	20180627	1930
131803203-2	1588	86	5.42%	1401	20180718004	20180711	2276
				7	20180710023	20180706	1506
				3	20180704035	20180627	1930
13201803202	1443	67	4.64%	1352	20180622025	20180615	2570
				91	20180601003	20180523	195
131803202-3	1161	28	2.41%	844	20180808004	20180801	1409
				317	20180814005	20180809	2000
13201805251	1645	7	0.35%	1645	20180814005	20180809	2000

11201805197	10	1	10.00%	10	20180904007	20180829	1487
p10-131808049-4	1480	52	3.51%	320	20180821019	20180814	600
				353	20180824021	20180820	715
				807	20180828029	20180823	1198
p10-13201808049	944	77	8.16%	62	20180821019	20180814	600
				112	20180824021	20180820	715
				106	20180828029	20180823	1198
				342	20180904007	20180829	1487
				322	20180912029	20180906	2700
p23-13201808049	964	103	10.68%	675	20180828029	20180823	1198
				70	20180904007	20180829	1487
				69	20180912029	20180906	2700
				150	20180927013	20180920	3371
p40-20180713002	290	19	6.55%	290	20180507003	20180425	500

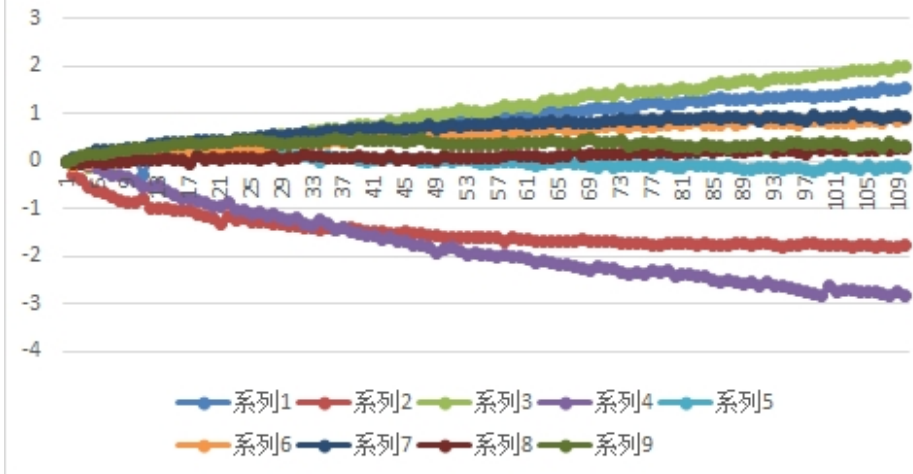
3. Perhaps, you can provide the serial number of your test crystals so that we may track to our production batch.

目前晶体已使用在产品中，无法确认对应的晶体序号。

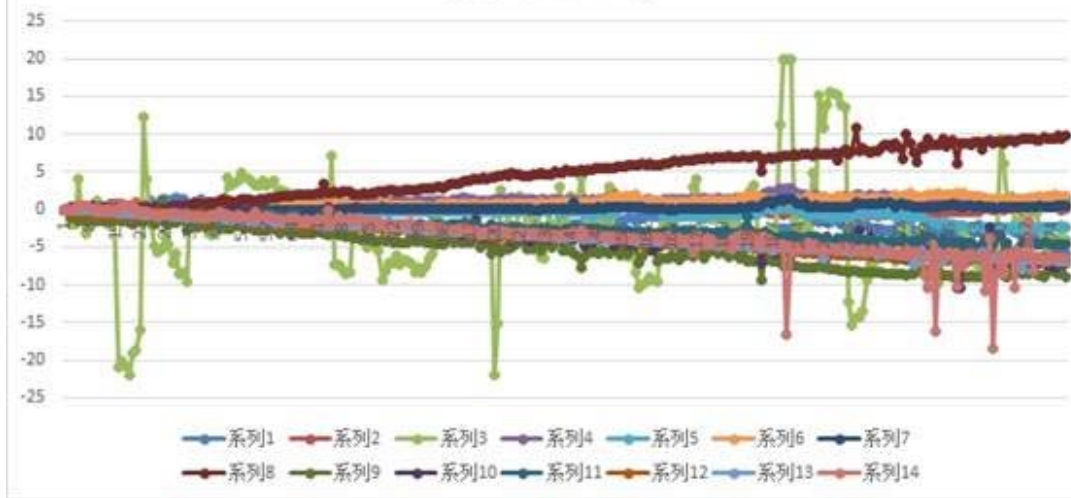
4. Be specific about what aging criteria you consider as aging failure, frequency jump failure , specify a number to each criterion. Although Dapu TEMPH900226 aging spec only requires  $\pm 50$  ppb yearly aging after 30 days, we are willing to work with you to address other aging related concerns.

老化判定标准年老化 $\pm 50$ ppb,日老化 $\pm 0.45$ ppb,以下是合格品与异常品的老化曲线对比，合格的晶体日老化在 $\pm 0.45$ ppb范围内，而异常的晶体每天的变化超过了5ppb以上。附件是一部分的老化数据，请查看。

合格的老化曲线



异常的老化曲线



Dapu Telecom Technology Co.,Ltd

Contact person: Jesse(唐佳)

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发件人: Wei Zhang

发送时间: 2018-11-16 04:14

收件人: Mueller, Luke; sqe@dptel.com

抄送: ????; guohua.cheng; ling.tong; wangcm

主题: RE: RE: 关于10M晶体老化不良问题

Hi Jesse,

Just to add to Luke's email below, in order to have a more productive conversation regarding your concern of aging, please provide us more specific information of your aging data in addition to Luke's questions:

1. Provide time stamp of your aging data. Your data do not have time interval between each measurement so we can't use it to calculate aging.
2. Provide aging failure rate from each previous shipment. This will help to find the trends of aging performance over time of each batch to gauge when the aging problem start and how significant the problem is.
3. Perhaps, you can provide the serial number of your test crystals so that we may track to our production batch.
4. Be specific about what aging criteria you consider as aging failure, frequency jump failure , specify a number to each criterion. Although Dapu TEMPH900226 aging spec only requires  $\pm 50$  ppb yearly aging after 30 days, we are willing to work with you to address other aging related concerns.

If you can prepare the above information and answers to Luke's questions, we think a conference call then will become much more productive.

If you insist a call tomorrow, **Friday Beijing time 9:30 pm** will work for us or we can have a conference call at **Beijing time 9:30 pm next Tuesday** which will allow us more time to look into your data and understand the problem.

Please let us know. Thank you.

Wei Zhang

Crystal Engineer

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**From:** Mueller, Luke  
**Sent:** November-15-18 1:39 PM  
**To:** 'sqe@dptel.com'; Wei Zhang  
**Cc:** '????'; guohua.cheng; ling.tong; wangcm  
**Subject:** RE: RE: 关于10M晶体老化不良问题

Hello Jesse

Please provide the specific data I have requested before the conference call so we may review. Your comment that the aging rate is getting worse and worse is not very instructive in our analysis. Also you have sent data on 3 sheets with 128 pcs each. In all cases you are not providing the corresponding time stamp for your data measurement so we are unable then to analyze the aging as a function of time – please provide time stamp data.

Also please clarify your criteria with respect to aging failure. Your specification requires +/- 50 ppb/yr and depending upon aging time of the attached data it seems that this is being met.

Luke B. Mueller  
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**From:** sqe@dptel.com [mailto:sqe@dptel.com]  
**Sent:** November 15, 2018 12:36 PM  
**To:** Mueller, Luke; Wei Zhang  
**Cc:** 晶体采购; guohua.cheng; ling.tong; wangcm  
**Subject:** 回复: RE: 关于10M晶体老化不良问题

Hello Luke、wei:

Sorry for the file sent error, the attachment is 10M crystal aging data, please check,;  
This time with your feedback is to inform Croven, the aging rate is getting worse and worse, the specific number of bad is still in the statistics.

The questions raised below will be answered to you after confirmation tomorrow.thank you!

- 1) When was Dapu first aware of an aging problem? (we have been shipping this part to you since June 2017)
- 2) How many parts has Dapu tested for aging behaviour?
- 3) How many of the parts tested fail the agreed specification item 6 which is < +/- 50 ppb/y after 30 days?
- 4) Is the failure rate changing over time? Can you advise failure quantity per shipment line item above so we may see if there is a trend?

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**Dapu Telecom Technology Co.,Ltd**

**Contact person: Jesse(唐佳)**

**Tel : 0769-88010888-886**

**Phone:18814332206**

**Email: sqe@dptel.com**

**Address: BLDG16,Northern industrial Zone,SSL Sci & Tech Industry Park ,DongGuan,GuangDong,China 523808**

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发件人: Mueller, Luke

发送时间: 2018-11-16 00:42

收件人: sqe@dptel.com; Wei Zhang

抄送: ????; guohua.cheng; ling.tong; wangcm

主题: RE: 关于10M晶体老化不良问题

Hello Jesse

I am unable to open the Excel file you have attached as it seems to be corrupted. Please verify the file integrity and then send a copy which we can open so that we may review the data before we have a conference call. In addition please answer the following questions:

1) When was Dapu first aware of an aging problem? (we have been shipping this part to you since June 2017)

<b>Ship Qty</b>	<b>Shipped</b>
150	06/28/2017
115	10/19/2017
385	12/19/2017
96	02/23/2018
172	03/27/2018
234	04/18/2018
500	04/25/2018
120	05/09/2018
195	05/23/2018
2570	06/15/2018
1930	06/27/2018
1506	07/06/2018
2276	07/11/2018
1409	08/01/2018
2000	08/09/2018

600	08/14/2018
715	08/20/2018
1198	08/23/2018
1487	08/29/2018
2700	09/06/2018
3206	09/13/2018
3371	09/20/2018
3067	09/27/2018
4500	10/04/2018
5000	10/11/2018
5000	10/18/2018
6000	10/25/2018
2267	10/30/2018
4800	11/06/2018
3600	11/13/2018

- 2) How many parts has Dapu tested for aging behaviour?
- 3) How many of the parts tested fail the agreed specification item 6 which is  $\pm 50$  ppb/y after 30 days?
- 4) Is the failure rate changing over time? Can you advise failure quantity per shipment line item above so we may see if there is a trend?

Please provide this data and after we review we can arrange a conference call to discuss.

Thanks

Luke B. Mueller  
President  
Croven Crystals  
Wenzel International, Inc.

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email: [lmueller@crovencrystals.com](mailto:lmueller@crovencrystals.com)

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**From:** sqe@dptel.com [mailto:sqe@dptel.com]  
**Sent:** November 15, 2018 11:14 AM  
**To:** Wei Zhang; Mueller, Luke  
**Cc:** 晶体采购; guohua.cheng; ling.tong; wangcm

**Subject:** 关于10M晶体老化不良问题

张工

您好，Croven供货的TEMPH900226 ( 10M ) 晶体，在我司生产反馈使用在产品中发现许多日老化超出规格，曲线晃动不平稳，且老化日波动 > 0.4ppb，不良率目前统计约7~10%，老化不良的产品我司更换了不同位置至少测试了3次，仍然是日老化项目不合格，附件是老化测试结果，我希望与Croven共同讨论关于老化率不良问题解决方案，请确认北京时间2018年11月16日20：30分您是否有时间。我司会议电话号码是+86-0769-88010888, 分机是877，主要讨论近期发生的不良及老化率问题。谢谢！

会议讨论的内容：

- 1.反馈Croven的异常分析进度。
- 2.晶体表面标记有6位数与7位数，影响区分。
- 3.老化率持续上升，需讨论不良解决方案。

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**Dapu Telecom Technology Co.,Ltd**

**Contact person:** Jesse(唐佳)

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