

电缆模 Cable dies

型号规格表示方法（新型号和原型号）Type and specification(new type and old type)

DE

新型号 New Type	原型号 Old Type	Dimension (mm) 基本尺寸			Reference dimension(mm) 参考尺寸								
		D	H	D	L	h	h1	a	β	R	r	e	
DE-0702020-2.8	84656	70	20	2.8	21.6	3	5	20	45	3		2	
DE-0702020-3.6	78516	70	20	3.6	23.0	3	5	20	45	3		2	
DE-0702020-4.0	871397	70	20	4.0	21.6	3	5	16	45	3	0.4	2	
DE-0702020-4.7	831798	70	20	4.7	23.0	3	5	16	45	3	0.4	2	

DC

新型号 New Type	原型号 Old Type	Dimension (mm) 基本尺寸			Reference dimension(mm) 参考尺寸								
		D	H	D	C	h	h1	a	e2	R	r	e	
DC - 0502524 - 11.7		50	25	11.7	4.8	5	4.5	24	-	3	-	3	
DC - 0502524 - 13.3		50	25	13.3	9.9	6	4.5	24	1.5	3	0.2	0	
DC - 0502524 - 18.1		50	25	18.1	6.8	6	4.5	24	1.5	3	0.2	6	
DC - 0502524 - 18.2		50	25	18.2	15.0	6	4.5	24	1.5	3	0.2	0	
DC - 0502524 - 27.1		50	25	27.1	10.3	7	6	24	1.5	3	0.2	8	

DF

新型号 New Type	原型号 Old Type	Dimension (mm) 基本尺寸			Reference dimension(mm) 参考尺寸								
		D	H	D	C	h	h1	a	R	R1	r	e	
DF-0452512-9.2		45	25	9.2	4.8	6		12	5	3.8	0.3	2	
DF-0452512-10.7		50	25	10.7	9.9	6		12	5	4.4	0.3	2	
DF-0452512-13.0		50	25	13.0	6.8	6		12	5	5.4	0.3	2	

DL

新型号 New Type	原型号 OldType	Dimension (mm) 基本尺寸				Reference dimension(mm) 参考尺寸							
		D	H	A	B	C	D	E	F	R	R1	a	a 1
DL-0402228-9.3		40	22	9.3	10.2	5.7	8.0	2.5	0.5	6	5.3	50	35
DL-0402228-10.8		40	22	10.8	11.8	5.7	8.0	2.5	1.3	6	6.0	50	35
DL-0402228-11.8		40	22	11.8	12.8	5.7	8.0	2.5	1.8	6.0	6.5	50	35
DL-0402228-12.3		40	22	12.3	13.2	6.7	8.7	2.5	1.9	6.3	6.6	54	37
DL-0402228-13.1		40	22	13.1	13.7	8.2	9.4	2.7	2.4	6.5	6.9	67	44
DL-0402228-14.1		40	22	14.1	14.5	9.7	10.4	3.0	3.6	7.2	7.3	72	48
DL-0402228-15.5		40	22	15.5	15.8	11.4	11.8	3.1	3.0	7.8	7.8	79	55
DL-0402228-15.9		40	22	15.9	15.9	12.3	13.5	1.3	0.8	8.0	8.7	70	60

新技术标准 New technical standard

模坯尺寸的允许偏差

Size of blanks' allowable tolerances

1.圆形孔模坯尺寸的允许偏差

Tolerances of circular hole blanks' size

1.1 内径尺寸允许偏差 Inner diameter of blank & Tolerances

Dimension (mm) 基本尺寸	Tolerances 允许偏差	Dimension (mm) 基本尺寸	Tolerances (mm) 允许偏差
0.1~0.30	0 -0.05	>9.0~24.0	0 -0.30
>0.30~0.40	0 -0.06	>24.0~32.0	0 -0.50
>0.40~0.60	0 -0.08	>32.0~40.0	0 -0.60
>0.60~3.0	0 -0.10	>40.0~55.0	0 -0.80
>3.0~6.0	0 -0.15	>55.0~90.0	0 -1.0
>6.0~9.0	0 -0.20		

1.2 外径尺寸允许偏差 Outer diameter of blank & Tolerances

Dimension (mm) 基本尺寸	Tolerances (mm) 允许偏差
≤10	+0.20 0
>10~16	+0.30 0
>16~30	+0.40 0
>30~35	±0.25
>35~40	±0.30
>40~45	±0.35

>45~50	±0.40
>50	±1.3%D

1.3 高度尺寸允许偏差 Height of blank & Tolerances

Dimension (mm) 基本尺寸	Tolerances (mm) 允许偏差
≤10	±0.20
>10~20	±0.30
>20~30	±0.40
>30~40	±0.50
>40~50	±0.50
>50~60	±0.80

2. 多边形孔模坯尺寸的允许偏差

Tolerances of circular hole blanks' size

2.1 内径尺寸允许偏差 Inner diameter of blank & Tolerances

Dimension (mm) 基本尺寸	Tolerances (mm) 允许偏差	Dimension (mm) 基本尺寸	Tolerances (mm) 允许偏差
≤2	0 -0.25	>20~25	0 -0.85
>2~4	0 -0.35	>25~32	0 -0.90
>4~6	0 -0.40	>32~40	0 -1.00
>6~12	0 -0.50	>40~50	0 -1.40
>12~16	0 -0.65	>50~60	0 -1.80
>16~20	0 -0.75	>60~75	0 -2.00

2.2 外径尺寸允许偏差 Outer diameter of blank & Tolerances

Dimension (mm) 基本尺寸	Tolerances (mm) 允许偏差
≥7~30	±0.50
>30~50	±0.80
>50~65	±1.30
>65~80	+1.80 -1.30
>80~120	+2.30 -1.80

3.3 高度尺寸允许偏差 Height of blank & Tolerances

Dimension (mm) 基本尺寸	Tolerances (mm) 允许偏差
≤20	±0.40
>20~30	±0.50

>30~40	±0.60
>40~50	±0.80
>50~60	±1.0

老技术标准 Old technical standard

圆形孔模坯 Round-hole die

内孔尺寸允许偏差: Inner hole of blank & Tolerances

尺寸 size	≤1	>1~2	>2~4	>4~6	>6~12	>12~16
允许偏差 Tolerances	0 -0.15	0 -0.2	0 -0.3	0 -0.35	0 -0.4	0 -0.5
尺寸 size	>16~20	>20~50	>25~32	>32~40	>40~55	>55~90
允许偏差 Tolerances	0 -0.6	0 -0.7	0 -0.8	0 -1.0	0 -1.2	0 -1.5

外径尺寸允许偏差: Outer diameter of blank & Tolerances

尺寸 size	≤16	>16~20	>20~30	>30~40	>45~50	>50~60
允许偏差 Tolerances	+0.8 0	+0.9 0	+1.0 0	+1.3 0	+1.6 0	+1.9 0
尺寸 size	>60~70	>70~80	>80~90	>90~120	>120	
允许偏差 Tolerances	+2.1 0	+2.4 0	+2.6 0	+2.8 0	+3.5 0	

外径 D 大于 50 mm 的允许偏差是 1.3%D tolerances is 1.3 1.3%D when OD>50mm

高度尺寸允许偏差: Height of blank&tolerances

尺寸 size	≤10	>10~20	>20~30	>30~40	>40~50
允许偏差 tolerances	±0.4	±0.5	±0.6	±0.7	±0.8

拉伸模芯头 S30、LS30、S31、LS31、模坯 Carbide floating plugs for drawing die

芯头内孔尺寸允许偏差: Inner hole of blank&tolerances for carbide floating plugs

尺寸 size	>10~20	>20~30	>30
允许偏差 tolerances	+1.0 0	+1.2 0	+1.5 0

芯头外径尺寸允许偏差: Outer diameter of blank&tolerance for carbide floating plugs

尺寸	>10~20	>20~30	>30~40	>40~50	>50~64	>64
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size						
允许偏差 tolerances	+0.7 +0.2	+0.8 +0.2	+0.9 +0.2	+1.0 +0.2	+1.2 +0.2	+2.0 +0.2

芯头高度尺寸允许偏差: Height of blank&tolerances for carbide floating plugs

尺寸 size	>10~20	>20~30	>30~40	>40~50
允许偏差 tolerances	±0.5	±0.6	±0.7	±0.8

多边形孔模坯 polygonal-hole drawing die

内孔尺寸允许偏差: Inner hole of blank&tolerances

尺寸 size	≤2	>2~4	>4~6	>6~12	>12~16	>16~20
允许偏差 tolerance	0 -0.3	0 -0.4	0 -0.45	0 -0.55	0 -0.7	0 -0.8
尺寸 size	>20~25	>25~32	>32~40	>40~50	>50~60	>60~75
允许偏差 tolerance	0 -0.9	0 -1.0	0 -1.1	0 -1.5	0 -2.0	0 -2.2

外径尺寸允许偏差:Outer diameter of blank&tolerance

尺寸 size	≤30	>30~40	>40~50	>50~60	>60~70	>70~80
允许偏差 tolerance	+1.0 0	+1.4 0	+1.7 0	+2.0 0	+2.3 0	+2.5 0
尺寸 size	>80~90	>90~100	>100~130	>130		
允许偏差 tolerance	+2.8 0	+3.0 0	+3.5 0	+4.0 0		

按 YB881-76 标的多边形外径公差执行同

高度尺寸允许偏差: Height of blank&tolerance

尺寸 size	≤20	>20~30	>30~40	>40~50	>50~60
允许偏差 tolerance	±0.6	±0.7	±0.8	±1.0	±1.5

拉丝模的技术要求 The technical requirements of drawing die

1、拉丝模的化学成分、物理力学性能和金相组织结果应符合相应硬质合金牌号标准规定

Chemical composition, physical and mechanical properties and the results of metallurgical structure for Drawing Die should be consistent with the corresponding standard of carbide grades.

2、拉丝模的断面组织不允许有分层、裂纹、未压好、空洞、脏化、黑心、脱碳、严重渗碳

Cross-section tissue of drawing die is not allowed any delamination, cracks, uncompacted, empty hole, dirty, and black, decarburization, serious carburization.

4.拉丝模的表面不允许有起皮、分层、裂纹、未压好、鼓泡、渗碳和麻孔，工作部分不允许有痕迹、粘料、凹坑和掉边掉角，非工作部分掉边掉角的长 X 宽不大于 1.0X0.5mm，深度不大于 0.5mm。The surface of drawing die is not allowed to appear peeling, delamination, cracks, uncompacted, bubbling, carburization and air marking; working part does not allow any traces, viscous materials, pit, off-side and off-angle, the length multiplied by width of off-side & off-angle for non-working parts is not more than 1.0*0.5mm, the depth not more than 0.5 mm.

包装：

1. 本公司出厂的合格模坯表面整体矩形面积大于 0.8 平方厘米时，每个模坯都清楚地标明合金牌号；当整体矩形面积小于 0.8 平方厘米时，不作单个标志。
2. 本公司出厂的产品，每盒内都是同一牌号、同一规格的产品。
3. 每盒内都附有产品合格证；包装盒上加贴标签，其上注明：①制造厂名；②合金牌号；③模坯型号；④模坯批号；⑤重量；⑥生产日期；⑦“力洲”牌商标。

Packing:

1. When the whole rectangle area of our company's eligible blank's surface is larger than 0.8 cm², each blank should mark the carbide grade clearly; when the whole rectangle area is smaller than 0.8 cm², no mark on it.
2. The product from our company will be packed in each inner box with the same grade and size.
3. Every inner box has attached with the "passed certificate", and pasted the label on the inner box to mark: ①name of manufacture; ②grade; ③blanks type ④blanks item no; ⑤weight; ⑥ manufacture date ⑦ "LIZHOU" brand.

模具基本使用守则

要充分发挥硬质合金模具的优良性能，达到最高的使用寿命，获得高质量的金属制品，使用时必须遵守下列规则：

1. 根据拉制、冲压材料的物理机械性能和材料大小，合理地选择硬质合金牌号。
2. 在拉制和冲压前，应先检查拉伸机和冲床运行时是否平稳，不得有跳动，否则硬质合金模具易受损坏。
3. 在拉制和冲压前，对拉制和冲压的金属材料表面，应仔细进行清理。如准备工作做得不好，就会导致硬质合金模具的使用寿命降低，金属材料上形成划痕，表面质量低劣。
4. 正确地选择润滑剂，就能延长硬质合金模具的使用寿命，提高拉制线材和冲压件的质量。
5. 高速拉制和冲压时，对硬质合金模具的冷却和工作区的良好润滑，都能提高硬质合金模具的使用寿命。

6.根据拉制和冲压金属材料的大小和性能，合理选择压缩率，可以延长硬质合金模具的使用寿命，提高生产效率。

7. 在拉制和冲压过程中，需注意控制金属材料表面状况。如发现因模孔粘附金属微粒，而使金属材料表面形成划痕时，应立即停车，将粘附的金属微粒除去，把模孔抛光。以后在使用之前，应将模孔中的金属微粒仔细地清除干净。

8. 硬质合金模具最合理的使用方法是，不等模孔壁上出现粘附的金属微粒，就作定期检查，发现不正常现象，及时进行处理。

9. 硬质合金模具应妥善保管，暂时不用的模具，应涂上防锈油保护。

The basic using regulation of the mould

To develop the excellent capability of the carbide mould, get the longest using-life, produce the high quality metal product, you'd better obey below regulation

1. Select the grade properly according to the drawing and punching raw material's physical mechanical capability and size.
2. Before drawing and punching, you should check if the drawing and punching machine are steady when running and without jumpiness, otherwise the carbide mould is easy to be hurt.
3. Before drawing and punching,, you should clean the surface of the punching and drawing material carefully. If not, the carbide mould's using-life will be shorter and formed the nick on the metal and bad quality of the surface.
4. Select the lube correctly could longer the using-life of the carbide mould, improving the quality of the drawing wear and punching accessory.
5. When drawing and punching in high speed, the good lubricate to the working area and cooling to the carbide mould could longer the using-life of the carbide mould.
6. To select the compressibility according to the size and capability of the drawing and punching material could longer the using-life of the carbide mould and improve the production efficiency.
7. During the process of drawing and punching, please note to control the surface of the material. If find form the nick on the surface because of attached metal powder on the mould inner hole, you should stop the machine and get rid of the metal powder and polishing the mould's inner hole. So before using, you should clean the metal powder attached in the mould inner hole.
8. The properly using way of the carbide mould is, before appeared the metal powder on the mould's inner hole, checked it timely to find the abnormality and treat it on time.
9. Keep the carbide mould proper, wipe the rust-resistant oil to protect the mould that is not use presently.

模具的保养与维修 The maintenance and repair of mould

有效的保养与维修模具，对降低拉丝成本至关重要。

Effective maintenance and repair for mould, it is essential to reduce the cost of drawing.

由于线材的振动，在拉丝模压缩区内最先接触线材的区域首先产生一个轻微的环状磨损，随后不断扩大直至定径区，导致线材表面质量严重下降，线材尺寸扩大。不仅如此，严重的磨损会使模具产生横向裂痕（主要出现在软丝的拉制中）或纵向裂痕（主要出现在硬丝的拉制中），至使模具过早报废。

As a result of wire vibration, the area of contacting wire firstly in the

compression zone of drawing die will come into being a minor ring wear in the first, and then expanding until the sizing zone, resulting in a serious decline in the surface quality of wire, expansion in the size of wire. Not only that, but a serious tear and wear will make mould to appear a horizontal cracks (mainly in the soft drawn wire) or longitudinal cracks (mainly in the hard-drawn wire), until make die end-of-life prematurely.

因此，要针对被拉制线材的种类、拉丝机的特点，科学地制定拉丝模保养规范。一般情况下，轻微的环状磨损只需进行抛光即可重新恢复使用，或稍加扩大直径亦可满足拉丝要求。过度的磨损会使模具修复次数大大降低，甚至报废，使得拉丝成本增加。

Therefore, to make drawing die's maintenance criterion scientifically according to the type of pulled wire, the characteristics of drawing wire machine. Under normal circumstances, minor ring wear need only polish to reuse, or expand a little diameter to meet stretched requirement. Excessive wear will greatly reduce the times of mould repaired, even scrapped, making the drawn cost increase.

如果您对修模有困难，即可致电、致函本公司。我们随时愿意为您降低拉丝成本而尽绵薄之力。

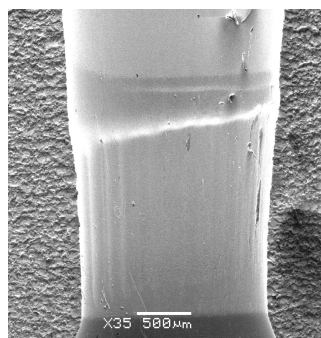
If you have difficulties in repairing mould, please call, or write to our company. We're ready to reduce drawn costs for you anytime and make our pygmy efforts.

拉伸模磨损及原因分析 Wear of drawing die and the reason analysis

硬质合金拉伸模在使用过程中，会因孔型结构不合理，镶套时钢套与模芯不同轴，加工水平低，达不到型结构的技术标准，以及拉拔工艺存在的问题，均会使拉伸模的受力状态发生改变，从而产生不同形式的磨损，下面我们就经常遇到的一些现象总结如下：

Carbide drawing die can't be up to technical standards of pass structure in the process of usage, because pass structure is irrational, steel bushing and mould core is not the same shaft in button die, and processing ability is low ; will be changed its strained condition due to the problem of drawn technics; thus different wear and tear are occurred. we summarize the phenomena often encountered as below:

一：环沟磨损 Wear of ring groove



环沟：对使用后的拉伸模 观察发现，有 80% 以上的拉伸模工作区的入口端，通常有一道磨损得比其它部位更加严重得环形沟槽，拉丝行业称之为环沟。

Ring groove: through the observation of after-use drawing die, more than 80% drawing die in the entrance of working area, there are usually a ring groove to be more severe wear than other parts, drawing-wire industry called as ring groove.

产生原因: Cause

模壁受到的摩擦作用较强，引起碳化钨颗粒逐渐剥落，形成粗糙面，粗糙面又从钢丝表面刮落金属屑，使润滑条件恶化，磨损速度加快，最终导致模壁产生环状沟槽。

The friction is strong for die wall, caused gradually peeling off of tungsten carbide particles and formed rough surface, then rough surface scratches off swarf from the metal wire surface, deteriorated the conditions of lubrication, speeded wear and tear, which eventually led to die wall to engender ring groove.

被拉体进入工作区之前有一个沿其轴线的恒定速度，当刚进入工作区变形时的瞬间，速度的大小及方向发生了变化，形成速度涡流，如同液体流动时受阻，对其阻碍有“冲刷”作用一样，对工作区该区域起“冲刷”作用，引起模壁磨损，成为环沟磨损的起磨线。

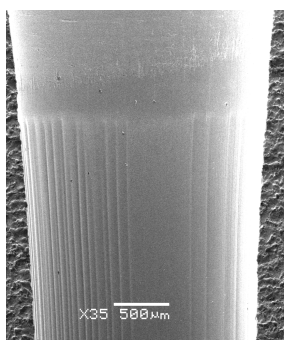
There is a constant speed along its axis before drawn body entering the work area. when drawn body is just entering work area in the instant of deformation, rate and direction is changed and formed the vortex of speed. It's just like the liquid flows to be blocked and have "erosion" for its impediment, drawn body effects "erosion" for the area, then causes the die wall wear, forms the earliest grinding line of ring groove wear.

解决办法: Solution

轻微环沟磨损可以视为正常磨损，严重的环沟磨损应适当增加反拉力或适当减小工作区角度。

Minor ring groove wear could be seen as normal wear, severe ring groove wear should be appropriately increased counter pull or reduced the angle of work area.

二、拉痕磨损: Stretched marks wear



拉痕：一种于拉拔方向一致的沟痕。 Stretched marks: a groove marks in accordance with drawing direction

产生的原因是：Occured reasons:

1、受环沟磨损的影响。To be the effects of ring groove wear
2、工作区角度过小或钢丝减面率过大。The angle of the work area is too small or the draft of steel is too large

3、钢丝表面存在较多的氧化斑痕，拉拔前没有经过很好的表面涂层处理，表面凹凸不平的钢丝对膜壁产生较多“咬合”作用，使两者之间摩擦作用增大，从而引起 WC 颗粒剥落。

Wire surface exists more trace of oxidation, not pass good surface coating process before drawing,wire of uneven surface effect more "engagement" action for die wall,increased the friction between the wire surface and membranous wall,which led to drop of WC particles.

4、润滑剂的性能与所拉钢丝种类及拉拔工艺条件不匹配，或钢丝表面涂层厚度不够，扑捉润滑剂的能力减低，从而造成润滑效果不好。

The performance of lubricants doesn't match with the type of drawing wire and the condition of stretching technics,or the thickness of wire surfact coating is not enough,lowered the ability of catching lubricants,thus result in not good lubrication effect.

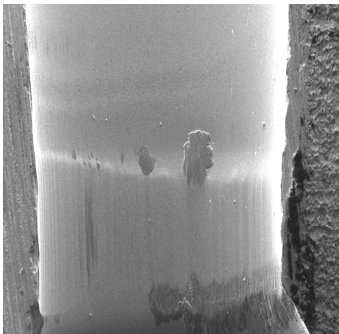
5、模具表面加工粗糙，光洁度不够，使钢丝与膜壁的摩擦作用增加。

Mould surface is processed rough, not enough smoothness, it increses the friction between steel wire and die wall

解决办法：Solution

1. 改进钢丝拉拔前的表面处理工艺。To improve the surface treatment technics before the wire drawing
2. 选择性能合适的润滑剂。To select the appropriate lubricant
3. 提高模具的表面光洁度。To raise the surface smoothness of mould

三、焊合损伤 bonding damage



在拉伸模工作区钢丝与膜壁首先接触的位置上方，牢固的粘附着面积大小不一的金属片，即为“焊合”现象

Wire and die wall contact firstly the top of location in the drawing die's work area, adhered to stoutly metal sheet of various sizes, which is "bonding" phenomenon.

焊合损伤产生的原因主要是：钢丝拉拔前表面处理不干净，残留有氧化铁皮。

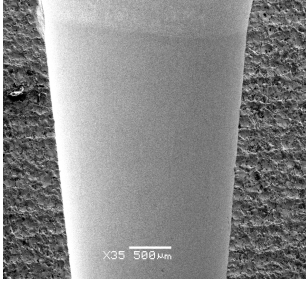
The main reason caused bonding damage is: the surface treatment is not clean before wire stretched, there are residual oxidized iron sheet.

解决办法：是力求拉丝生产厂家改进拉拔前对钢丝的表面处理，避免氧化铁皮的带入。

Solution: wire manufacturer should make efforts to improve the surface treatment of steel before stretch begin, avoid to bring the oxidized iron sheet

四、不同轴磨损 The wear of different axis

模孔不均匀磨损后，钢丝直径出现一定的不圆度 the wire diameter will appear some non-circular when die hole exists uneven wear.



不同轴磨损产生的原因：The reason caused different-axis wear

1. 钢丝拉拔前不圆度超差，模壁受力不均匀，直径大的一侧，模壁所受的作用力较大，摩擦力也相应增加，从而磨损也自然较钢丝直径小的一侧较大。

Non-perimeters of wire is out-of-tolerance before drawing, die wall stressed uneven, die wall suffered a large force in the large-diameter side and the friction is increased correspondingly, thus wear and tear is also naturally larger than the side of small-diameter wire.

2. 钢套与模芯不同心 steel bushing and mould core is not the same axis

3. 拉伸模在拉丝机上摆放的位置不正，是模具与钢丝不同轴，从而产生单边磨损。

Drawing die is placed uncorrect position on the drawing machine, die and wire not in the same axis, thus resulting in unilateral wear.

4. 拉伸模内孔局部密度不均匀，使加工后的模具表面光洁度不均匀，局部光洁度较差的地方，由于摩擦系数较大，从而磨损较快。

The partial density of inside hole for drawing die is uneven, so that surface finish of the die processed is uneven. Partial smoothness is poor, due to the larger coefficient of friction and thus wear and tear is more fast.

解决办法：Solution:

1 如果不同轴磨损发生在第一道模具，当然只能是要求从钢丝的盘料尺寸精度入手。

If the wear of different axis occurs in the first mould, of course, it's only set about the dimensional precision of wire feed.

2. 如果发现模具工作区与润滑区相交位置不在同一水平上，问题自然产生镶套质量上应从提高镶套加工技术。

If it is found that the work area intersects with the lubrication zone to not be the same level position, button die will naturally have problem, process technique of button die should be enhanced.

3 如果模具工作区与润滑区相交位置在同一水平上，而模具磨损位置不在工作区的同一水平上，则是模具在拉丝机上的位置摆放不正。

If the work area and lubrication zone intersects at the same level position, and the location of mould wear is not the same level in the work area, the mould is placed uncorrect in the drawing machine.