

## Demagnetization analysis on magnet box

With the rapid development of construction industrialization in developing countries, more and more PC factories began to use magnet box to fix sideform, but many factories also complain, there will be obvious demagnetization after a period of time using the magnet box, . Since the holding force is not enough, magnet can not fix the formwork tightly, the quality of precast concrete panel can not be guaranteed in this way, so that many customers start to doubt the application effect of magnet box. At the same time, the magnet box wastage is also serious, many customers think it' s not advantageous to the traditional bolted fixing and labor cost, this seriously affected the application prospect of magnet box.

Based on our visit to and feedback from many factories, combined with our professional knowledge of magnetic materials and magnetic assemblies, we did some analysis on the reason of magnet box' s demagnetization after usage, meanwhile in order to improve the magnet box quality , avoid holding force attenuation, we introduce our new production technique, and provide magnet box maintenance manual advice for reference.

### 1. Working Temperature

Usually Magnet box is made of sintered ndfeb magnet material, which is widely used in many industry fields, from the common magnetic component, to the permanent magnet motor, voice coil motor, sound horn, mobile phone vibration motor, etc. According to the different application, it's possible to select the different magnet performance grades. Please refer to below character of NdFeB magnet material.

Grade	Br	Hcb	Hc j	( BH ) <sub>max</sub>	Tw
	mT	kA/m	kA/m	kJ/m <sup>3</sup>	
	(kGs)	(kOe)	(kOe)	(MGOe)	
N35	1170-1220	≥ 868	≥ 955	263-287	80 ℃
	(11.7-12.2)	( ≥ 10.9)	( ≥ 12)	(33-36)	
N38	1220-1250	≥ 899	≥ 955	287-310	80 ℃
	(12.2-12.5)	( ≥ 11.3)	( ≥ 12)	(36-39)	
N40	1250-1280	≥ 907	≥ 955	302-326	80 ℃
	(12.5-12.8)	( ≥ 11.4)	( ≥ 12)	(38-41)	
N42	1280-1320	≥ 915	≥ 955	318-342	80 ℃
	(12.8-13.2)	( ≥ 11.5)	( ≥ 12)	(40-43)	
N45	1320-1380	≥ 923	≥ 955	342-366	80 ℃
	(13.2-13.8)	( ≥ 11.6)	( ≥ 12)	(43-46)	
N48	1360-1400	≥ 923	≥ 955	366-390	80 ℃
	(13.6-14.0)	( ≥ 11.6)	( ≥ 12)	(43-46)	
N52	1430-1480	≥ 796	≥ 876	398-422	60 ℃
	(14.3-14.8)	( ≥ 10.0)	( ≥ 11)	(50-53)	
33M	1130-1170	≥ 836	≥ 1114	247-263	100 ℃
	(11.3-11.7)	( ≥ 10.5)	( ≥ 14)	(31-33)	
35M	1170-1220	≥ 868	≥ 1114	263-287	100 ℃
	(11.7-12.2)	( ≥ 10.9)	( ≥ 14)	(33-36)	
38M	1220-1250	≥ 899	≥ 1114	287-310	100 ℃
	(12.2-12.5)	( ≥ 11.3)	( ≥ 14)	(36-39)	
40M	1250-1280	≥ 923	≥ 1114	302-326	100 ℃
	(12.5-12.8)	( ≥ 11.6)	( ≥ 14)	(38-41)	
42M	1280-1320	≥ 955	≥ 1114	318-342	100 ℃
	(12.8-13.2)	( ≥ 12.0)	( ≥ 14)	(40-43)	
45M	1320-1380	≥ 995	≥ 1114	342-366	100 ℃
	(13.2-13.8)	( ≥ 12.5)	( ≥ 14)	(43-46)	
48M	1360-1430	≥ 1027	≥ 1114	366-390	100 ℃
	(13.6-14.3)	( ≥ 12.9)	( ≥ 14)	(46-49)	
50M	1400-1450	≥ 1033	≥ 1114	382-406	100 ℃
	(14.0-14.5)	( ≥ 13.0)	( ≥ 14)	(48-51)	

38H	1220-1250	$\geq 899$	$\geq 1353$	287-310	120 ℃
	(12.2-12.5)	( $\geq 11.3$ )	( $\geq 17$ )	(36-39)	
40H	1250-1280	$\geq 923$	$\geq 1353$	302-326	120 ℃
	(12.5-12.8)	( $\geq 11.6$ )	( $\geq 17$ )	(38-41)	
42H	1280-1320	$\geq 955$	$\geq 1353$	318-342	120 ℃
	(12.8-13.2)	( $\geq 12.0$ )	( $\geq 17$ )	(40-43)	
45H	1320-1360	$\geq 963$	$\geq 1353$	342-366	120 ℃
	(13.2-13.6)	( $\geq 12.1$ )	( $\geq 17$ )	(43-46)	
48H	1370-1430	$\geq 995$	$\geq 1353$	366-390	120 ℃
	(13.7-14.3)	( $\geq 12.5$ )	( $\geq 17$ )	(46-49)	
35SH	1170-1220	$\geq 876$	$\geq 1592$	263-287	150 ℃
	(11.7-12.2)	( $\geq 11.0$ )	( $\geq 20$ )	(33-36)	
38SH	1220-1250	$\geq 907$	$\geq 1592$	287-310	150 ℃
	(12.2-12.5)	( $\geq 11.4$ )	( $\geq 20$ )	(36-39)	
40SH	1240-1280	$\geq 939$	$\geq 1592$	302-326	150 ℃
	(12.5-12.8)	( $\geq 11.8$ )	( $\geq 20$ )	(38-41)	
42SH	1280-1320	$\geq 987$	$\geq 1592$	318-342	150 ℃
	好文档, 让好朋友也看到 ×	$\geq 12.4$	( $\geq 20$ )	(40-43)	
45SH	1320-1380	$\geq 1003$	$\geq 1592$	342-366	150 ℃
	(13.2-13.8)	( $\geq 12.6$ )	( $\geq 20$ )	(43-46)	
28UH	1020-1080	$\geq 764$	$\geq 1990$	207-231	180 ℃
	(10.2-10.8)	( $\geq 9.6$ )	( $\geq 25$ )	(26-29)	
30UH	1080-1130	$\geq 812$	$\geq 1990$	223-247	180 ℃
	(10.8-11.3)	( $\geq 10.2$ )	( $\geq 25$ )	(28-31)	
33UH	1130-1170	$\geq 852$	$\geq 1990$	247-271	180 ℃
	(11.3-11.7)	( $\geq 10.7$ )	( $\geq 25$ )	(31-34)	
35UH	1180-1220	$\geq 860$	$\geq 1990$	263-287	180 ℃
	(11.8-12.2)	( $\geq 10.8$ )	( $\geq 25$ )	(33-36)	
38UH	1220-1250	$\geq 876$	$\geq 1990$	287-310	180 ℃
	(12.2-12.5)	( $\geq 11.0$ )	( $\geq 25$ )	(36-39)	
40UH	1240-1280	$\geq 899$	$\geq 1990$	302-326	180 ℃
	(12.5-12.8)	( $\geq 11.3$ )	( $\geq 25$ )	(38-41)	
28EH	1040-1090	$\geq 780$	$\geq 2388$	207-231	200 ℃
	(10.4-10.9)	( $\geq 9.8$ )	( $\geq 30$ )	(26-29)	
30EH	1080-1130	$\geq 812$	$\geq 2388$	223-247	200 ℃
	好文档, 让好朋友也看到 ×				

35EH	1170-1220	$\geq 876$	$\geq 2388$	263-287	200 ℃
	(11.7-12.2)	( $\geq 11.0$ )	( $\geq 30$ )	(33-36)	
38EH	1220-1250	$\geq 899$	$\geq 2388$	287-310	200 ℃
	(12.2-12.5)	( $\geq 11.3$ )	( $\geq 30$ )	(36-39)	
28AH	1040-1090	$\geq 787$	$\geq 2624$	207-231	230 ℃
	(10.4-10.9)	( $\geq 9.9$ )	( $\geq 33$ )	(26-29)	
30AH	(1080-1130)	$\geq 819$	$\geq 2624$	223-247	230 ℃
	(10.8-11.3)	( $\geq 10.3$ )	( $\geq 33$ )	(28-31)	
33AH	1130-1170	$\geq 843$	$\geq 2624$	247-271	230 ℃
	(11.3-11.7)	( $\geq 10.6$ )	( $\geq 33$ )	(31-34)	

As the picture show, maximum working temperature of sintered ndfeb magnet material can reach 230 degrees, minimum grade material' s maximum working temperature is 80 degrees, so, we usually use N or M grade material to make magnet box, if the production and maintenance temperature is lower than 80 degrees, there will be no any effect for magnet box holding force, If we need magnet box work at 80 degrees or above, we should use higher grade ndfeb materials.

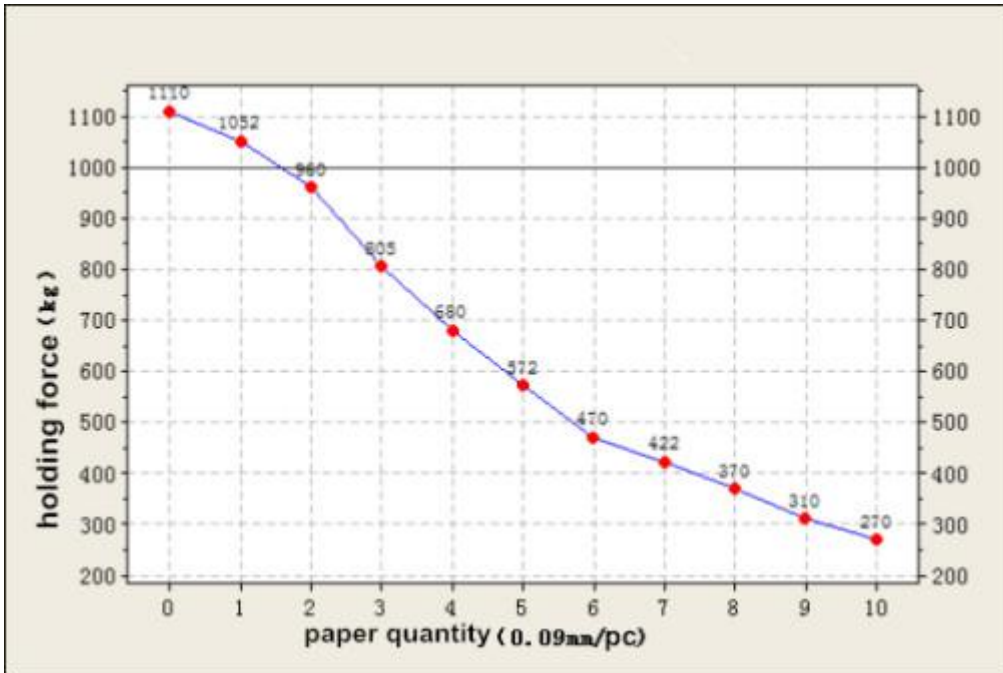
## **2.Magnet box bottom surface not smooth,can't fixed the formwork tightly.**

Magnet holding force usually depends on the distance of the magnet pole,the farther away,the holding force is weaker.

When the magnet box work, the suction side at the bottom of the magnet box is tightly attached to the steel platform. But when there are sundries (such as concrete, grease, film) at the bottom, the magnet box is not closely attached to the platform, and the holding force will be significantly reduced.

As a prove, we tested our SX-1000 magnet box to study the relationship of holding force and the gap between magnet box bottom and the platform . We put 0 ~ 10 pieces A4 paper (thickness 0.09 mm) between the bottom of the magnet box and the platform and then test the holding force with different gap. The test data is as below:





As the picture show, the gap between the bottom of the magnet box and the platform will significantly influence the holding force, so we recommend customer to maintain the magnet box according to the following methods:

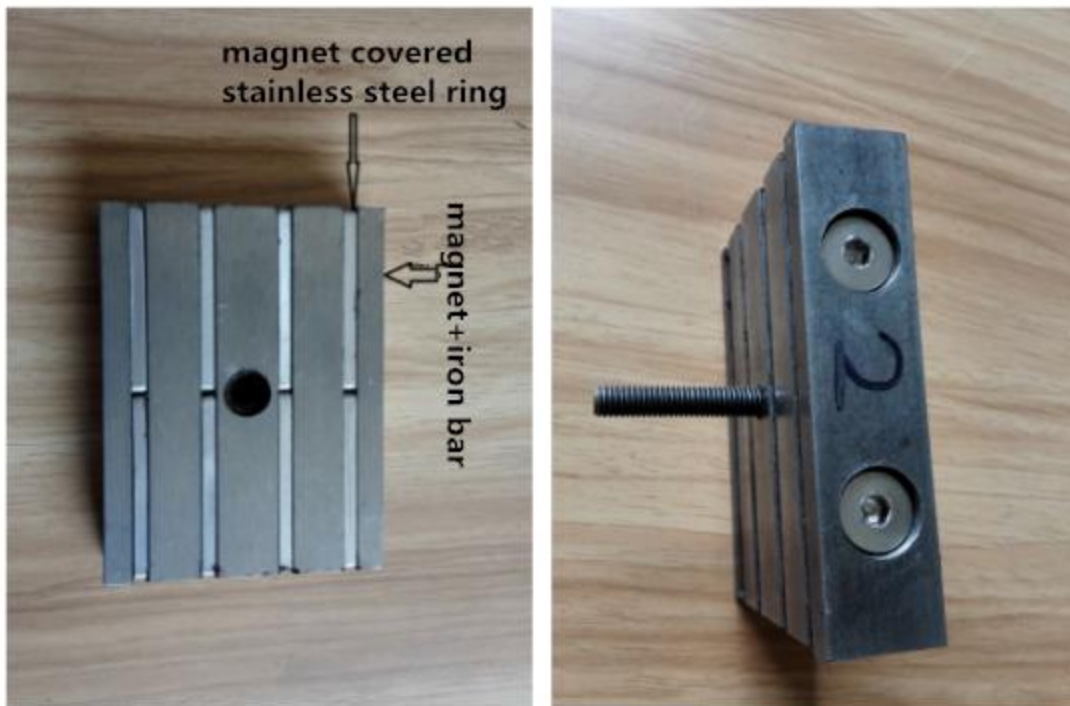
Before use it, we should confirm the magnet box bottom and platform is clean and flat. If the bottom have sundries, we can use stainless steel scraper to clean (iron scraper will be attached to magnet, it can't clean up), if it is not easy to clean up material such as hard concrete, we can use polisher to clean. Like the below picture shows: firstly Install polishing brush on the polisher, and then polish the magnet box bottom to make it clean and flat.



Magnet box bottom sundries, not clean up



Meanwhile, because of the magnetic block structure, if we can't control the production process strictly, it may also cause magnetic surface not smoothed, because the magnetic block is connected by the magnet and iron bar through the bolts, like the following figure.



If the screw hole size and position can't be controlled strictly, it will cause whole surface uneven after iron bar assembled, it needs to be smoothed by grinder. when magnetic block work, the screw which is longitudinal through the middle of the iron bar pull the whole magnetic block, if the hole size tolerance is larger, there is gap with the screw which transverse through the iron bar, can cause the misplace between

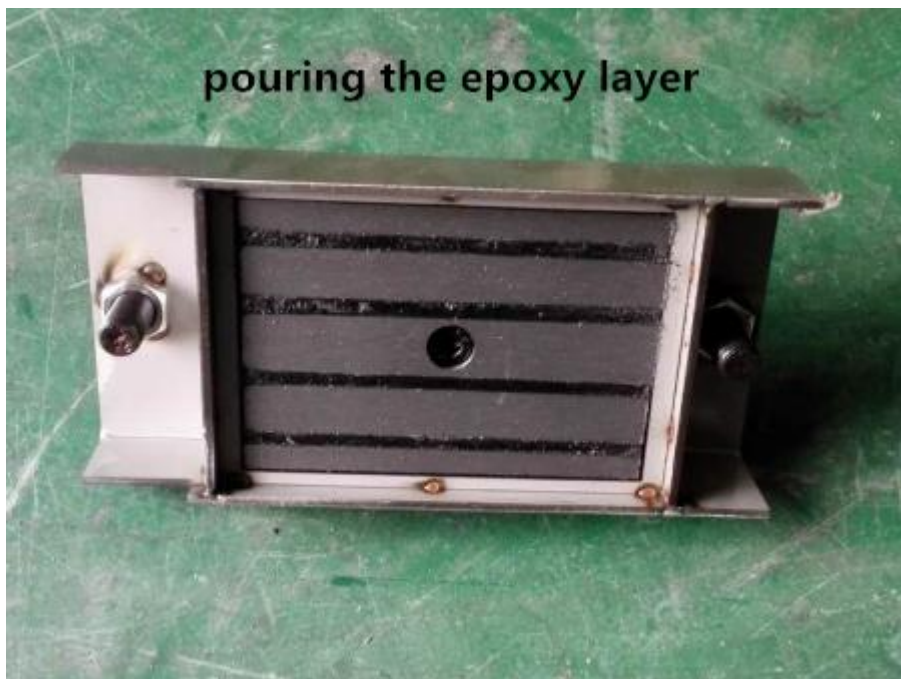
each bar, resulting in the whole magnetic surface uneven, will dramatically effect the magnetic block holding force.

### **3.The magnetic block inside magnet is damaged**

The physical properties of sintered ndfeb materials are hard and brittle, fragile and easy to corrode, so the magnet can't be struck, the coating on the surface should not be destroyed.If the magnet in the magnetic block is broken or damaged, the holding force of the magnetic block will decrease.

So when we assemble the magnetic block,the magnets plane should be under the iron bar plane, this can effectively avoid the collision, also the magnet needs protective layer itself, can prevent damage and corrosion.

In order to protect the magnet, we have two methods: one is pouring the epoxy layer between the magnet and the iron bar.the other is to cover the stainless steel ring directly to the magnet.





Above we share the experience and suggestions of the magnet box production process and maintenance measures, hope to extend the magnet box service life, possible to improve efficiency, reduce production cost.

We also welcome you make more valuable comments on this product from the user's perspective, hope more and more factories use the magnetic fixtures.