



**HARBIN HAFEI INDUSTRY CO., LTD.**  
**REGULATION**

Q/HGC0009-2018  
INSTEAD: Q/HGC0001-2016

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**JZ TYPE HIGH SPEED WIRE ROD PRODUCTION LINE**  
**FINISHING MILL GROUP**  
(Total 12 pages)

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HARBIN HAFEI INDUSTRY CO., LTD.

Issued

## Foreword

This regulation is specially formulated according to the GB/T 1.1-2009 《Directives for standardization – Part 1: structure and drafting of standards》, and combined with the actual situation of the companies scientific research, production and standardized control work.

The regulation stipulates constitute, parameter, technical order, test methods and inspection rule of JZ Type High Speed Wire Rod Production Line Finishing Mill Group(hereafter referred to as finishing mill group).

The regulation is appropriate for JZ Type High Speed Wire Rod Production Line Finishing Mill Group.

The regulation is proposed by the company' s standardization committee.

The regulation is drafted by Electromechanical Equipment Manufacturing Company.

The main drafter of the regulation is Wang Yongjiang, Shi Shaodong, Ren Zelong.

The management of the regulation is in charge of standardization administration department.

# JZ TYPE HIGH SPEED WIRE ROD PRODUCTION LINE FINISHING MILL GROUP

## 1 Subject content and sphere of application

The regulation stipulates constitute, parameter, technical order, test method and inspection rule of JZ Type High Speed Wire Rod Production Line Finishing Mill Group (hereafter referred to as finishing mill group).

The regulation is appropriate for JZ Type High Speed Wire Rod Production Line Finishing Mill Group.

## 2 Reference standard

The articles of the below document becomes the articles of this regulation after cited. The cited document with date and its later amending list (exclude mistake) or the revision are not situated this standard. However, encourage all parties which come to an agreement to study if use the latest versions of all these documents. For all cited document without date, its latest versions are applicable to this document

YB/T036.1 General Technical Conditions For Metallurgical Equipment Manufacturing- Production Test

GB/T3768 Determination Of Sound Power Levels And Sound Energy Levels Of Noise Sources - Survey Method

ISO10816 Standard For Evaluation Of Vibration Intensity

## 3 Finishing mill group working situation

Size of incoming material:  $\Phi 17\text{--}\Phi 23$  mm

Temperature of incoming material:  $\geq 850^{\circ}\text{C}$

Lubrication form of finishing mill group: thin oil centralized lubrication

Oil pressure:  $\geq 0.6\text{MPa}$

The temperature of supplied oil for equipment:  $\leq 42^{\circ}\text{C}$

Lubrication system consume: 1680L/min

Type of oil: Mobil 525、Shell, etc.

Cleanliness: NAS level 7

Hydraulic system of protective cover: operation pressure:  $\geq 15\text{MPa}$

Hydraulic system flow: 20 L/min

Driving dynamo: AC synchronized conversion motor, asynchronous DC motor, etc.

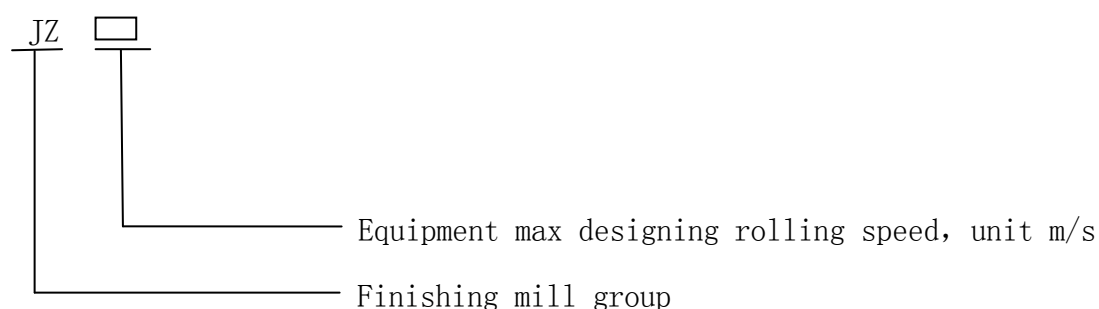
power: No less than 5500kW

Rotary speed: 1000-1500 r/min

#### 4 Type, constitute and parameter

##### 4.1 Type

Principle of type establishment:



##### 4.2 Constitute

The basic constitute of finishing mill group is as following:

- a、container of finishing mill group
- b、Acceleration Box
- c、Tapered gearbox
- d、roller case
- e、protectage of the group
- f、inter-rack coupling
- g、inter-rack coupling protectage
- h、baffle plates
- i、string detector

The finishing mill group normally consists of  $\Phi 230$  and  $\Phi 170$  finishing mills. The last two  $\Phi 170$  finishing mills are with super high-speed stands. The layout of the mill stands is  $45^\circ$  top crossing. Mill the work pieces transferred by the pony-roughing mill group into the finished wire with the dimension and accuracy which can meet the requirement through heavy-load, non-twist milling with micro tension of finishing mills.

### 4.3 Type and parameter

#### 4.3.1 Fundamental form and specification parameter

Mode of finishing mill: cantilever roll collared finishing mill

Quantity of mill stands: according the requirement

Form of layout:  $45^\circ$  top crossing, centralized drive for mill stands

Dimension of roll collar:

$\Phi 230$  finishing mill: nominal diameter  $\Phi 228.3\text{mm}$ , thickness  $72\text{mm}$

$\Phi 170$  finishing mill: nominal diameter  $\Phi 170.66\text{mm}$ , thickness  $57.35\text{mm}$  or  $70\text{mm}$

#### 4.3.2 Performance parameter

Size of finished part:  $\Phi 5.5\text{--}\Phi 20\text{mm}$

vibration:  $\leq 4\text{ mm/s}$  meet the specification of ISO10816

noise:  $\leq 85\text{dB}$  (1.5m away from the stand) meet the specification of GB/T3768

temperature of the bearings:  $\leq 80^\circ\text{C}$

## 5 Technical requirements

5.1 For each stand of finishing mill group, it should meet the relative standard specification of YB/T036.1, and manufacture as the drawing and technical documents approved in accordance with prescribed procedures.

5.2 For each stand of finishing mill group, it should be assembled in accordance with the corresponding standard and check. The inspection items include the gear mesh clearance, contact area, bearing radial and axial clearance, and some other data.

5.3 All the stands of the finishing mill group should do the manual turning check before linkage cold test. It is not allowed clamping stagnation phenomenon.

5.4 The finishing mill group should do the linkage cold test before delivery.

5.5 The clearness of the lubrication oil should be no less than NAS level 7, before the cold test and hot test of the finishing mill group.

5.6 When the finishing mill group does the linkage cold test, the whole group should run stable and move freely. When running, the cases and all parts should be stable. The gear mesh sound is normal, no crash and other noise. The entire performance index should be in accordance with the data requirement of 4.3.2.

5.7 When linkage cold test of the finishing mill group, the vibration and bearing temperature of each stand should be in accordance with the equipment performance index.

5.8 The sealed positions of the finishing mill group should not link. If link, find the place and deal with it.

5.9 The outer surface of the finishing mill group should not have any obvious defect. And boundary dimension should be in accordance with the requirement of the drawings.

5.10 After install on site, the finishing mill group should do the cold test again. Hot test should be done after cold test is eligible.

5.11 After cold test eligible in factory, the install on customer site of the finishing mill group should be done according to the production technical requirement.

## **6 Test methods**

6.1 The lubrication plant oil of the finishing mill group should be sampled after cycling filtration, and send it to the qualified testing department to check the clearness. The clearness should be no lower than NAS level 7. Start the lubrication station to check the oil temperature and pressure through the oil temperature

gauge and oil pressure gauge. Check all the lubrication points and oil returning situation.

6.2 In the situation that lubricate and no lubrication, check if the gap of the oil film bearing is normal with the dialgauge precision 0.01mm. It is used to confirm if the lubrication situation of the roller case meets the requirement.

6.3 Manual turns 9# or 10# stand with the stress application lever to check if the whole group has clamping stagnation phenomenon.

6.4 After slow start the group, when the rolling speed is stable at 30m/s, check if there is any un-normal noise.

6.5 Increase the rolling speed to 50m/s, to check if there is any un-normal noise. If have, stop the turning and check.

6.6 Severally increase the rolling speed to 70m/s、80m/s、90m/s、100m/s、110m/s、115m/s, turning 5 minutes, check the vibration (see appendix A、B)、check the temperature (see appendix C、D) and make the records.

## **7 Inspection rules**

### **7.1 In-process inspection**

Each stand of the finishing mill group should be made overall quality inspection on the gear mesh clearance, contact area, bearing radial and axial clearance, according to the drawing and related technical documents' requirement. For the main part and unit inspection original record, the Quality Inspection Department should keep and make overall inspection according to the standard

### **7.2 Check before delivery**

The check before delivery of the finishing mill group should be checked the vibration by the Quality Inspection Department according to the regulation. The finishing mill group can be delivered to the customer after signed the certificate of qualification.

## APPENDIX A

## (NORMATIVE ANNEX)

## Finishing mill group test records (vibration)

| table I       |           | FINISHING MILL GROUP TEST RECORDS (VIBRATION) |    |    |    |    |    |    |    |    |    |     |   |   |   | inspector: |   |  |  |  |  |
|---------------|-----------|-----------------------------------------------|----|----|----|----|----|----|----|----|----|-----|---|---|---|------------|---|--|--|--|--|
| Rolling speed | Test item | Measured value                                |    |    |    |    |    |    |    |    |    |     |   |   |   |            |   |  |  |  |  |
| 70m/s         | B<4mm/s   | Measured point                                | 1# | 2# | 3# | 4# | 5# | 6# | 7# | 8# | 9# | 10# | C |   |   | D          |   |  |  |  |  |
|               |           | X                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          | - |  |  |  |  |
|               |           | Y                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          | - |  |  |  |  |
|               |           | Z                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          | - |  |  |  |  |
| 80m/s         | B<4mm/s   | Measured point                                | 1# | 2# | 3# | 4# | 5# | 6# | 7# | 8# | 9# | 10# | C |   |   | D          |   |  |  |  |  |
|               |           | X                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          |   |  |  |  |  |
|               |           | Y                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          |   |  |  |  |  |
|               |           | Z                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          |   |  |  |  |  |
| 90m/s         | B<4mm/s   | Measured point                                | 1# | 2# | 3# | 4# | 5# | 6# | 7# | 8# | 9# | 10# | C |   |   | D          |   |  |  |  |  |
|               |           | X                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          |   |  |  |  |  |
|               |           | Y                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          |   |  |  |  |  |
|               |           | Z                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          |   |  |  |  |  |
| 100m/s        | B<4mm/s   | Measured point                                | 1# | 2# | 3# | 4# | 5# | 6# | 7# | 8# | 9# | 10# | C |   |   | D          |   |  |  |  |  |
|               |           | X                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          |   |  |  |  |  |
|               |           | Y                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          |   |  |  |  |  |
|               |           | Z                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          |   |  |  |  |  |
| 110m/s        | B<4mm/s   | Measured point                                | 1# | 2# | 3# | 4# | 5# | 6# | 7# | 8# | 9# | 10# | C |   |   | D          |   |  |  |  |  |
|               |           | X                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          |   |  |  |  |  |
|               |           | Y                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          |   |  |  |  |  |
|               |           | Z                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          |   |  |  |  |  |
| 115m/s        | B<4mm/s   | Measured point                                | 1# | 2# | 3# | 4# | 5# | 6# | 7# | 8# | 9# | 10# | C |   |   | D          |   |  |  |  |  |
|               |           | X                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          |   |  |  |  |  |
|               |           | Y                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          |   |  |  |  |  |
|               |           | Z                                             | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | - | - | - | -          |   |  |  |  |  |

Note: B: Vibration allowable value

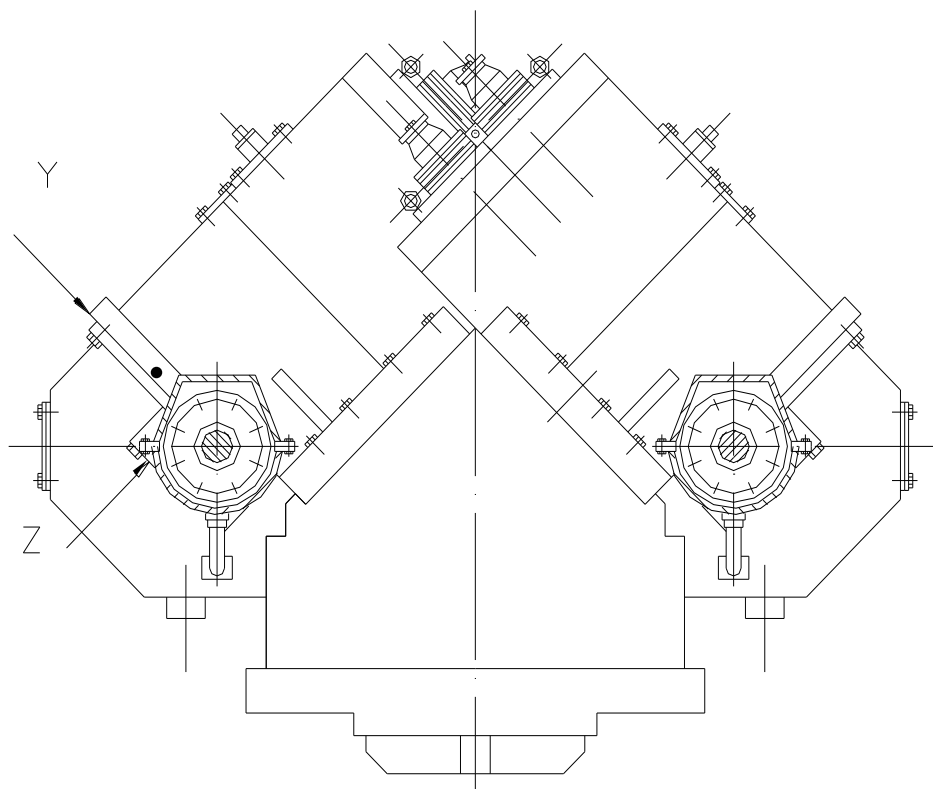
C: Acceleration Box

D: container

APPENDIX B

(INFORMATIVE ANNEX)

Finishing mill group vibration measured position and direction



X: ALONG THE ROLLING DIRECTION (PERPENDICULAR TO PAPER)

Y: AS SHOWN IN THE FIGURE

Z: AS SHOWN IN THE FIGURE

APPENDIX C  
(NORMATIVE ANNEX)

Finishing mill group test records (temperature)

| TABLE II      |           |                |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | FINISHING MILL GROUP TEST RECORDS (TEMPERATURE) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | INSPECTOR: |  |
|---------------|-----------|----------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|------------|--|
| Rolling speed | Test item | MEASURED VALUE |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |            |  |
| 70m/s         | B<50℃     | E              | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |            |  |
|               |           | -              | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |            |  |
|               |           | E              | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |            |  |
|               |           | -              | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |            |  |
|               |           |                |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |            |  |
| 80m/s         | B<55℃     | E              | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |            |  |
|               |           | -              | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |            |  |
|               |           | E              | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |            |  |
|               |           | -              | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |            |  |
|               |           |                |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |            |  |
| 90m/s         | B<65℃     | E              | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |            |  |
|               |           | -              | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |            |  |
|               |           | E              | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |            |  |
|               |           | -              | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |                                                 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |            |  |

|                                                                                                                |            |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------------------------------------------------------------------------------------------------------------|------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|                                                                                                                |            |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 100m/s                                                                                                         | B<<br>70°C | E | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|                                                                                                                |            | – | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  |
|                                                                                                                |            | E | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
|                                                                                                                |            | – | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  |
|                                                                                                                |            |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 110m/s                                                                                                         | B<<br>75°C | E | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|                                                                                                                |            | – | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  |
|                                                                                                                |            | E | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
|                                                                                                                |            | – | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  |
|                                                                                                                |            |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 115m/s                                                                                                         | B<<br>80°C | E | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|                                                                                                                |            | – | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  |
|                                                                                                                |            | E | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
|                                                                                                                |            | – | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  | –  |
| <div>Note: Measured positions see appendix D;<br/>B: temperature allowable value;<br/>E: measured point;</div> |            |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

## APPENDIX D

## (INFORMATIVE ANNEX)

Finishing mill group temperature measured positions drawing

