



## Introduction

- This type of testing machine is designed to perform bending and re-bending test on metallic materials, like rod steel, plate steel, steel pipe and rebar.
- Bidirectional hydraulic loading, easy to bend specimen with diameter  $\leq 50\text{mm}$  to  $180^\circ$ .
- Hand wheel drives bidirectional screw lead to adjust the support span; the support roller is self-lock; Plug-in type mandrel is simple to change.
- LCD control panel real-time displays displacement and speed.
- Speed is adjustable which fully complies with Clause 6.3 in standard ISO 7438:2005. In case of dispute, a testing rate of  $(1\pm 0.2)\text{mm/s}$  should be used.
- Real-time display of angle is easy for different angle bending test.

## Standards

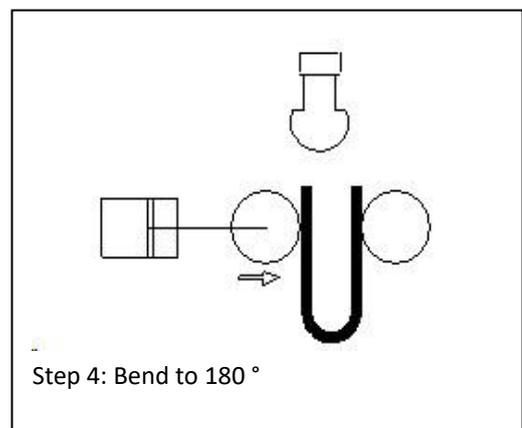
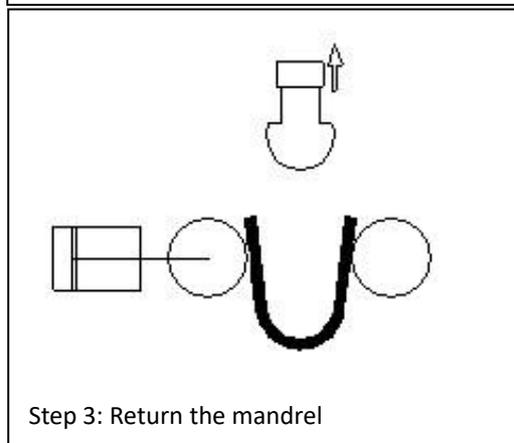
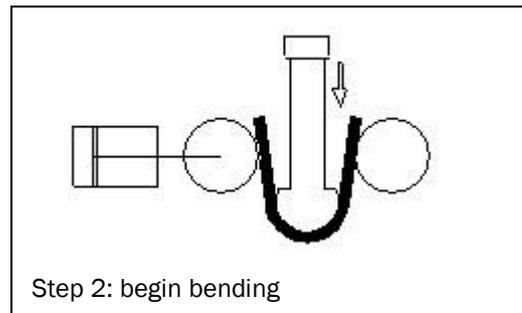
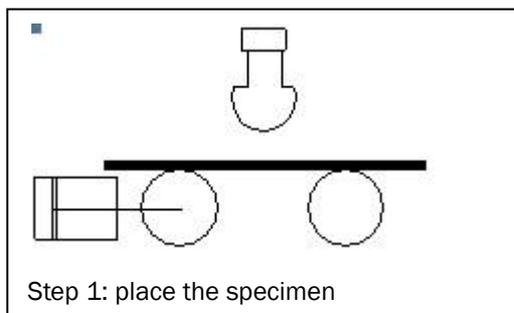
GB/T 232, GB/T 244, GB/T 3091, GB/T 8162, GB/T 13793, GB/T 28897

ISO 7438, ISO 8491, ISO 559, ISO 6935, BS 4449, BS 4482, BS EN 10080, DIN488-2, SS 212540, ASTM A775, ASTM A706

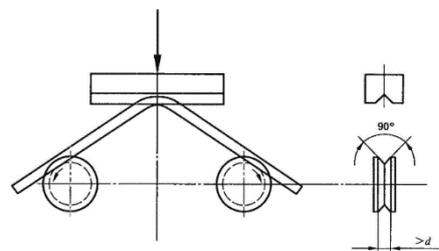
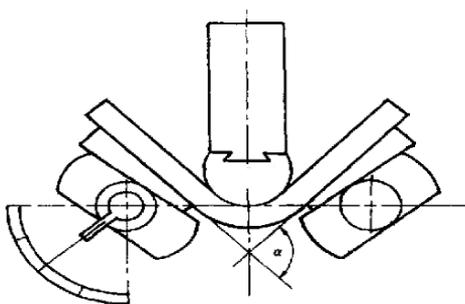
**Structure and working principal**

- This machine is designed with a vertical structure, easy to operate.
- Vertical design is easy to clear peel-off scraps from rebar during test.
- During test, vertical cylinder drives the mandrel to bend the specimen nearly 180 ° and return, and the horizontal cylinder drives the two supports to bend specimen exact 180°.
- Span adjustment is by trapezium lead screw, no need of locking nut.
- Encoder is for speed measurement and valve for speed adjustment, fully meeting the speed requirement for dispute test.

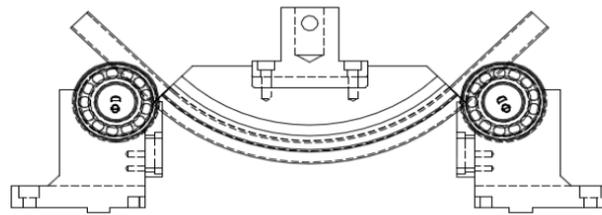
**Test procedure**



180° Rebar bend test



Rebar re-bend test



Steel pipe bend test



**Parameters**

Max pushing force(kN)	300
Vertical cylinder max travel(mm)	500
Vertical cylinder speed without specimen (mm/s)	0.5-4
Support roller diameter (mm)	45
Distance between supports (mm)	10~630mm
Mandrel diameter (mm)	Made according to test standards
Round specimen (mm)	Φ6~Φ50
Flat specimen thickness x width (mm)	(6~40)x50
Max. bending angle (°)	180
Power supply	3-phase, 380V, 50Hz
Power consumption(kW)	5.5
Main dimension(mm)	1470x735x2390
Weight (kg)	1700
Hydraulic power unit dimension (mm)	500×880×990
Hydraulic power unit weight (kg)	250
Hydraulic oil	46# anti-wearing hydraulic oil, 90 liter

**Standard accessories**

Name	Description	Quantity
Main machine	HBT305D	1 set
180° bending fixture	Support roller diameter: 45mm	1 set
Re-bend fixture (optional)		1 set
Pipe bending fixture (optional)		
Mandrels	Customized	1 set
Mandrel adapter	Mandrel: 1-27, 28-50, 54-96, 98-156, 160-288, 300-450	1 set
Hydraulic station		1 set
Protection shield		1 set
Maintenance tool		1 set

**ISO6935.1:2007 Plain bar**

Rebar d mm	180° bending	
	Mandrel D mm	Distance between supports mm
6	18	36
8	24	48
10	30	60
12	36	72
14	42	84
16	48	96
20	120	180
22	132	198

**Table 6 — Mandrel diameter to be used for the bend test**

Dimensions in millimetres

Nominal diameter <i>d</i>	Mandrel diameter (max.) <sup>a, b</sup>
≤ 16	3 <i>d</i>
16 < <i>d</i> ≤ 22	6 <i>d</i>

<sup>a</sup> By agreement between the manufacturer and purchaser, larger mandrel diameters may be used.  
<sup>b</sup> For nominal diameters larger than 22 mm, the mandrel diameters in bend tests shall be agreed between the manufacturer and purchaser.

**ISO6935.2:2015 Ribbed bar**

**Table 8 — Mandrel diameter to be used for the bend test**

Dimensions in

Nominal bar diameter <i>d</i>	Mandrel diameter (max.) <sup>a, b</sup>
≤ 16	3 <i>d</i>
16 < <i>d</i> ≤ 32	6 <i>d</i>
32 < <i>d</i> ≤ 50	7 <i>d</i>

<sup>a</sup> For nominal diameters larger than 50 mm, the mandrel diameter in bend tests shall be agreed between the manufacturer and purchaser.  
<sup>b</sup> By agreement between the manufacturer and purchaser, larger mandrel diameters may be used.

**Table 9 — Mandrel diameter to be used for the rebend test**

Dimensions in

Nominal bar diameter <i>d</i>	Mandrel diameter (max.) <sup>a, b</sup>
≤ 16	5 <i>d</i>
16 < <i>d</i> ≤ 25	8 <i>d</i>
25 < <i>d</i> ≤ 50	10 <i>d</i>

<sup>a</sup> For nominal diameters larger than 50 mm, the mandrel diameter in rebend tests shall be agreed between the manufacturer and purchaser.  
<sup>b</sup> By agreement between the manufacturer and purchaser, larger mandrel diameters may be used.

Rebar d mm	180°bending		Re-bend
	Mandrel D mm	Distance between supports mm	Mandrel D mm
6	18	36	30
8	24	48	40
10	30	60	50
12	36	72	60
14	42	84	70
16	48	96	80
18	108	162	144
20	120	180	160
25	150	225	200
28	168	252	280
32	192	288	320
40	280	400	400
50	350	500	500

### BS 4449 (CS2) rebend test (bend to 90° then rebend to 20°)

Nominal diameter $d$ , mm	Maximum mandrel diameter
≤16mm	$4d$
>16mm	$7d$

Nominal diameter $d$ mm	Maximum mandrel diameter mm	Distance between supports mm
6	24	42
7	28	49
8	32	56
9	36	63
10	40	70
12	48	84
16	64	112
20	140	200
25	175	250
32	224	320
40	280	400
50	350	500

## BS 4482 bend test (bend to 90° then rebend to 20°)

Mandrel diameter is 4d for grade 500, and 2d for grade 250.

Nominal diameter d mm	Mandrel diameter mm	Distance between supports mm	Mandrel diameter mm	Distance between supports mm
2.5	10	17.5	5	12.5
5	20	35	10	25
6	24	42	12	30
7	28	49	14	35
8	32	56	16	40
9	36	63	18	45
10	40	70	20	50
12	48	84	24	60

## BS EN 10080:2005

Mandrel diameter for the bend test		Mandrel diameter for the re-bend test	
Nominal diameter d mm	Mandrel diameter max.	Nominal diameter d mm	Mandrel diameter max.
≤ 16	3 d	≤ 16	5 d
> 16	6 d	> 16 ≤ 25	8 d
		> 25	10 d

Rebar d mm	180° bending		Re-bend
	Mandrel D mm	Distance between supports mm	Mandrel D mm
6	18	36	30
8	24	48	40
10	30	60	50
12	36	72	60
14	42	84	70
16	48	96	80
18	108	162	144
20	120	180	160
25	150	225	200
28	168	252	280
32	192	288	320
40	240	360	400
50	300	450	500

**DIN488-2:2016**

Rebar d mm	180°bending		Re-bend
	Mandrel D mm	Distance between supports mm	Mandrel D mm
6	30	48	Not specified
8	40	64	
10	50	80	
12	60	96	
14	70	112	
16	80	128	
20	160	220	
25	200	275	
28	224	308	
32	320	416	
40	240	360	

**SS 212540: 2014**

Mandrel diameter for the bend test 180°	
Nominal diameter d mm	Mandrel diameter max.
$4 \leq d \leq 10$	$1.5 d$
$10 < d \leq 20$	$2.0 d$
$20 < d \leq 32$	$3.0 d$
$32 < d \leq 50$	$4.0 d$

Mandrel diameter for the re-bend test	
Nominal diameter d mm	Mandrel diameter max.
$\leq 16$	$5 d$
$> 16 \leq 25$	$8 d$
$> 25$	$10 d$

Rebar d mm	180°bending		Re-bend
	Mandrel D mm	Distance between supports mm	Mandrel D mm
6	9	27	30
8	12	36	40
10	15	45	50
12	24	60	60
14	28	70	70
16	32	80	80
18	36	90	144
20	40	100	160
25	75	150	200
28	84	168	280
32	96	192	320

40	160	280	400
50	200	350	500

### ASTM A775

Bar No.	Mandrel D mm	Distance between supports mm	Bending angle
10	75	105	180°
13	100	139	180°
16	125	173	180°
19	150	207	180°
22	175	241	180°
25	200	275	180°
29	230	317	180°
32	250	346	180°
36	280	388	180°
43	430	559	90°
57	580	751 (not available)	90°

### ASTM A706

	Grade 60	Grade 80
<b>Bar No.</b>	<b>Mandrel diameter for 180° test</b>	
3,4,5	3d	3.5d
6,7,8	4d	5d
9,10,11	6d	7d
14,18	8d	9d

Bar No.	Grade 60		Grade 80	
	Mandrel D mm	Distance between supports mm	Mandrel D mm	Distance between supports mm
3 (10)	30	60	35	65
4 (13)	39	78	46	84.5
5 (16)	48	96	56	104
6 (19)	76	133	95	152
7 (22)	88	154	110	176
8 (25)	100	175	125	200
9 (29)	174	261	203	290
10 (32)	192	288	224	320
11 (36)	216	324	252	360
14 (43)	344	473	387	516
18 (57)	456	627	513	684(not available)