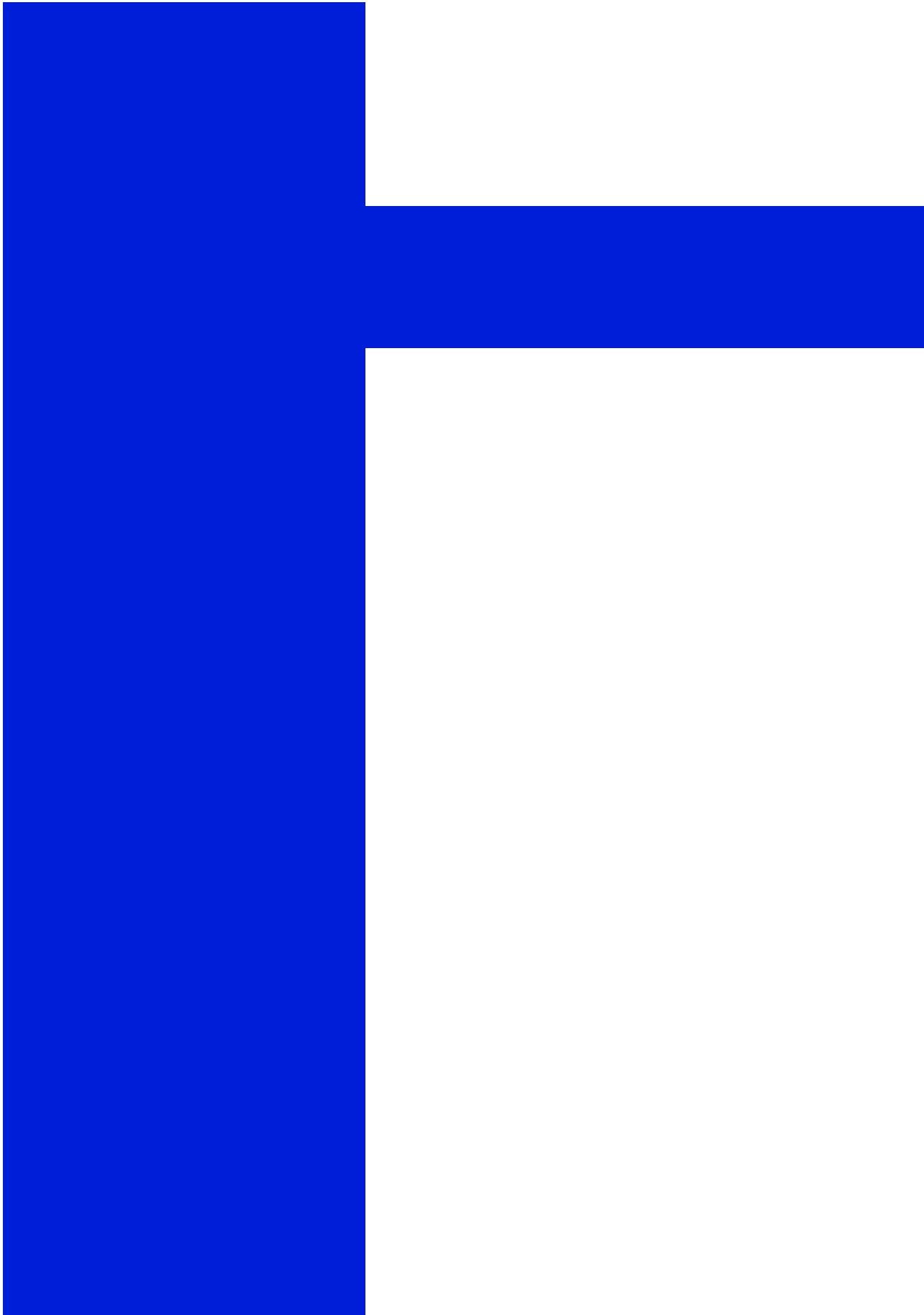




1 1 1 2 3 4 2 3

IDS

TP274

A

1001-9006 2022 01-0001-05

ZHOU Honglin¹, PU Xiaomin¹, LI Yong¹, ZHAO Zhihai², LI Rong³,
YANG Zhiwei⁴ LIU Ying² PAN Yifan³

(1. DEC Academy of Science and Technology Co.,Ltd, 611731, Chengdu, China;

2. China Academy of Information and Communications Technology, 100191, Beijing, China;

3. China Telecom Research Institute, 102200, Beijing, China;

4. Dongfang Electrical Machinery Co.,Ltd, 618000, Deyang, Sichuan, China)

Abstract: Under the background of the active development of industrial data space (IDS) research in major countries in the world, this paper first introduces the concept of industrial data space and four typical application scenarios. Based on the application and demand, this paper introduces the overall architecture of industrial data space, and then expounds the reference architecture model of industrial data space from the technical aspects of business, data and services, software and security. Finally, based on the scene of data model transmission in Dongfang Electric Corporation, a testbench is built to verify the feasibility of system deployment.

Key words: international data space (IDS); testbench; data asset; shared data; data sovereignty

36%

33%

80%

58%

2020 3

86%

2021-05-03

2020YFG0315

(1984)

5G

5G+

industrial data Space, IDS

[1]

GPS

1.3



1.1

OPC-UA
IT

1.4

IT

1.2



IDS

IDS

IDS

IDS

IDS

IDS

,
IDS



1

2

3.1

Data governance
data management

Collaborative
Business model

1

IDS

IDS

IDS

IDS

3.2

e

,
IDS
IDS
IDS

IDS

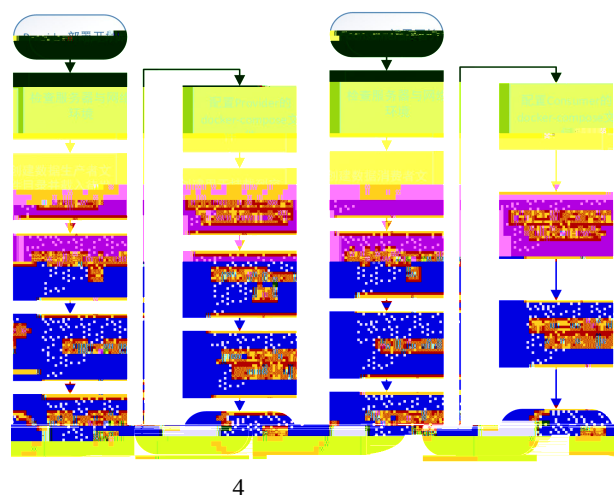
IDS

EXIC

INIC

3.4

2

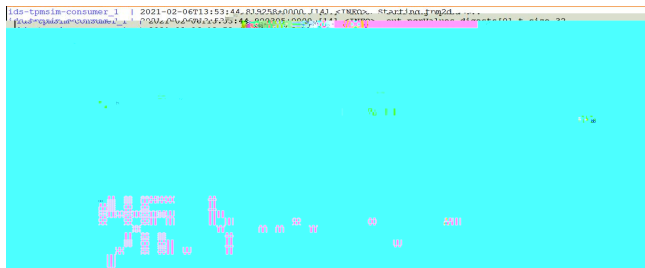


4.4

DECP1000

5

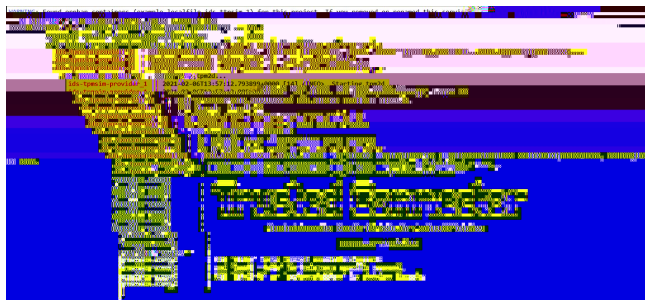
Trusted Connector consumer-core



5

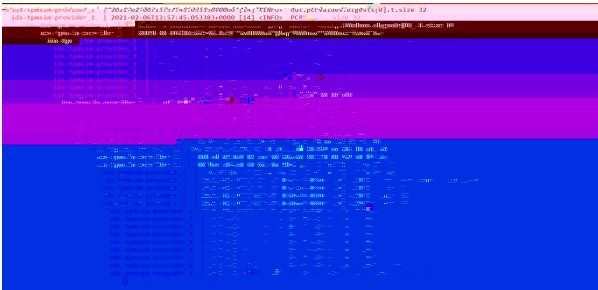
6

provider-core



6

7



7



[1] . [J]. 2020(6):52-54

[2] International Data Spaces Association. Reference Architecture Model[R/OL](2019-4) [2021-04-01].<https://www.fraunhofer.de/en/research/lighthouse-projects-fraunhofer-initiatives/international-data-spaces.html>

	1,2	1,2*	1,2	1,2
-	-		1.4~1.5 V	
		3		-
	3			
900			250	450
TM911.4	A	1001-9006	2022	01-0006-05

The Effect of Catalyst Supports on the Dynamic Durability of PEMFC Membrane Electrode Assembly

XIE Guangyou^{1,2}, LI Ting^{1,2*}, YAO Minxuan^{1,2}, LIU Peng^{1,2}

(1. Dongfang Electric Fuel Cell Technology Co., Ltd., 611731, Chengdu, China;

2.Sichuan Key Laboratory of Long-life Fuel Cells, 611731, Chengdu, China)

Abstract: The start-up and shut-down (SU/SD) play an important role in the degradation of proton exchange membrane fuel cell (PEMFC) for automobile applications. During the SU/SD process, because of the coexist of H₂ and O₂ in the anode, the cathode reaches a high potentials 1.4–1.5 V and results in severe corrosion of the carbon support. In this paper, three types of cathode catalyst layers are manufactured with three catalysts based different carbon supports, and the EIS, ECSA and polarization curves are evaluated as the increasing of SUSD cycles. The result shows that the more stable the carbon support is, the better durability the catalyst layer shows. The catalyst layer based graphitized carbon runs 900 SUSD cycles, the catalyst layer based semi-crystalline carbon tolerates 450 SUSD cycles but the one based amorphous carbon only tolerates 250 SUSD cycles.

Key words: catalyst; carbon supports; membrane electrode assembly; start-up and shut-down cycles; durability

Proton-exchange

membrane fuel cell PEMFC

[1-3]

PEMFC

2021-06-23

2019ZDZX0002

1983

2011

1985

2010

liting@dongfang.com

PEMFC

[4-6]

PEMFC

30% [5,7-8]

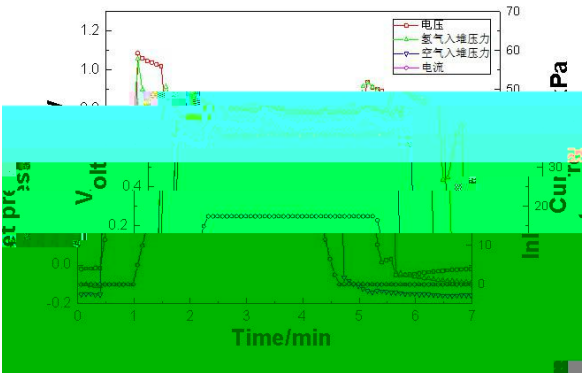
-

1.4~1.5 V

70 /

2.2/1.6 100%RH 100%RH

0 kPa 50



1

1.4

Gamery Reference 3000

70

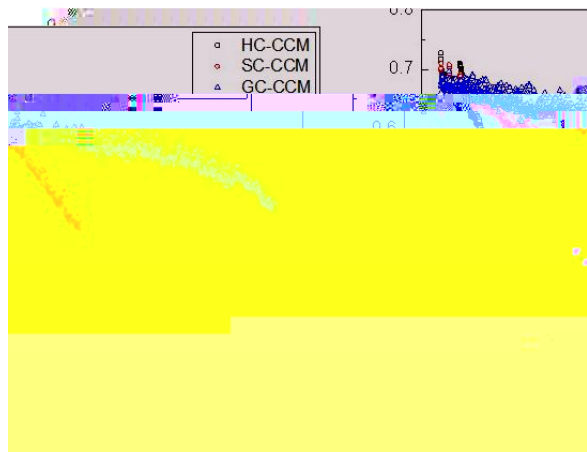
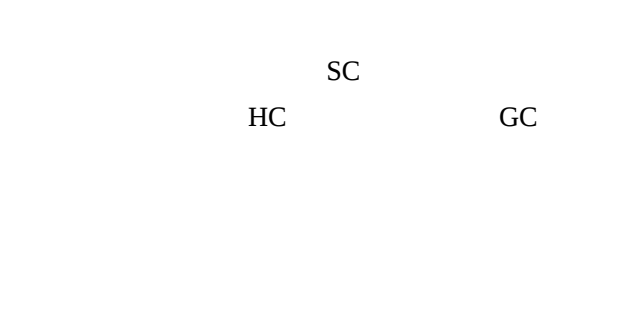
0.1 slpm 0.2 slpm

100%RH 0 kPa 0~1.2

V 20 mV/s

1

ECSA



2 3 CCM

1 3 CCM 0.7A/cm²

Sample		HC-CCM	SC-CCM	GC-CCM
ECSA Degradation Rate /%	50 cycles	-0.58	-1.31	+2.09
	150 cycles	-19.42	-5.40	-0.15
	250 cycles	-56.83	-13.28	-3.28
	350 cycles	—	-22.04	-2.09
	450 cycles	—	-63.36	-5.81
	550 cycles	—	—	-7.15
	750 cycles	—	—	-15.35
	950 cycles	—	—	-35.71

2.2

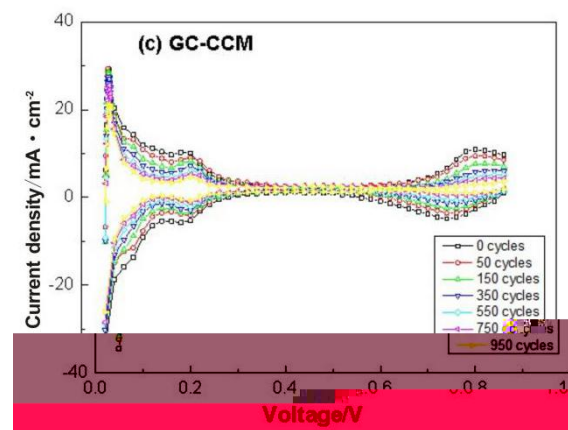
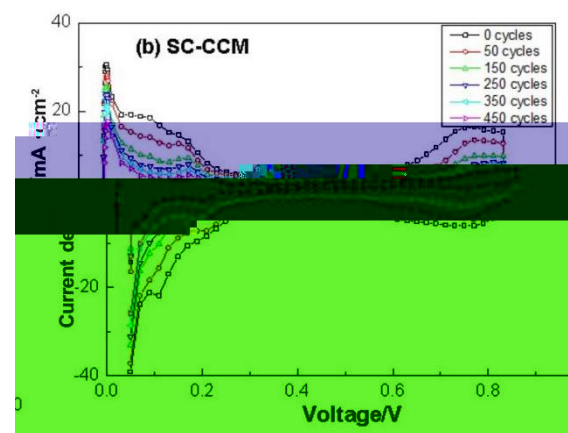
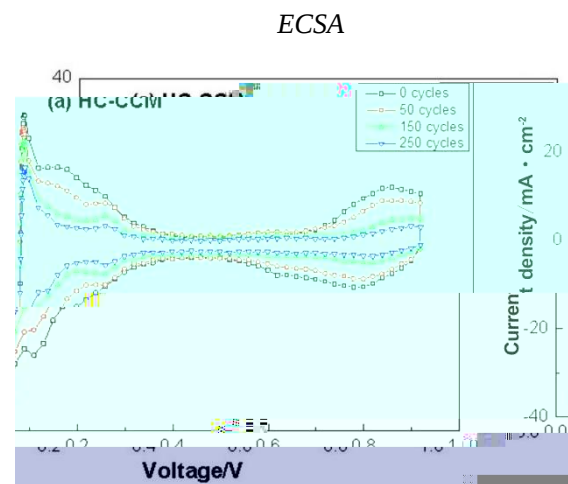
3

2.2.1

3

3

2



3 CCM

2

3 CCM

Sample	HC-CCM	SC-CCM	GC-CCM
50 cycles	-26.03	-23.85	-12.83
150 cycles	-52.74	-48.18	-23.21
250 cycles	-64.86	-55.25	-32.53
350 cycles	—	-64.39	-37.45
450 cycles	—	-72.27	-43.80
550 cycles	—	—	-47.40
750 cycles	—	—	-56.63
950 cycles	—	—	-66.09

ECSA
Degradatio
n Rate
/%

2.2.2

4

HC-CCM

SC-CCM

GC-CCM 3

HC-CCM 200

40% SC-CCM 400

25% GC-CCM

800

15%

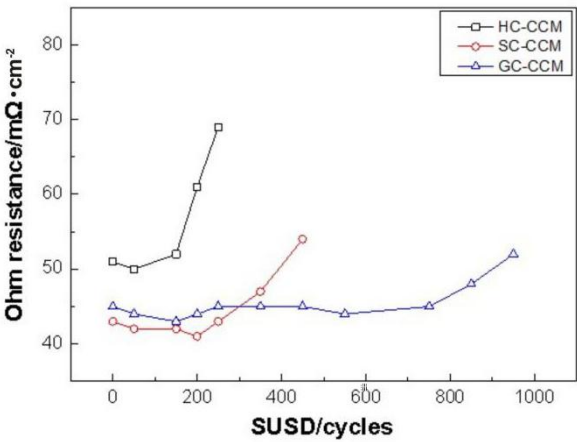
GC-CCM

HC-CCM

SC-CCM

2.2.1

ECSA



4 3 CCM

2.3

SEM

5

SEM

3

HC-CCM

250

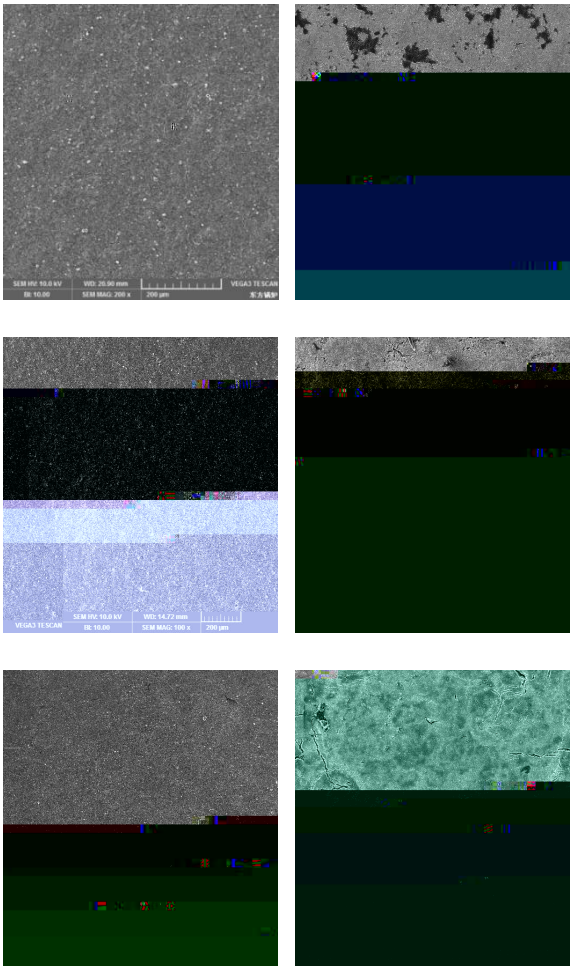
SC-CCM

450

HC-CCM

GC-CCM

950



5

3



-



PID
PID
Simulink PID PID
PID
PID PID Matlab
TM911 : A : 1001-9006 (2022) 01-0011-07

Application of Fuzzy PID Control in Hydrogen Fuel System

TANG Gang , LIAN Yong, YU Qi, ZHENG Xidong, PU Wei

Dongfang Electric Fuel Cell Technology Co., Ltd., 611731, Chengdu, China

Abstract: The application of hydrogen fuel cell in the field of new energy is increasing, and the corresponding control system has been widely studied. In order to improve the pressure control precision of hydrogen loop in hydrogen fuel cell system, a control strategy based on fuzzy PID in hydrogen loop is proposed in this paper . The control of hydrogen supply module in "hydrogen

[1] 1973

J.J.Ostergoard

[2]

[3]

PID

PID

PID



PID

PID

P I D

P

I D

P I D

PID

E

Ec

P I D

E

Ec

E Ec

P I D

1.1

[4]

PC

PID

PID

k_p k_i k_d

PID

PID

1

1.2

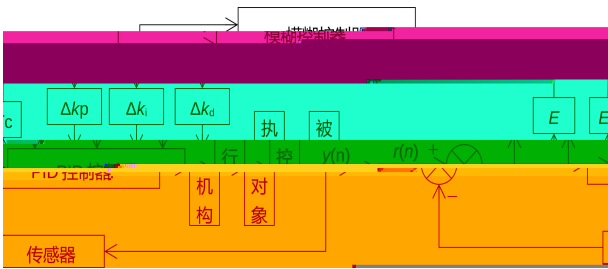
1

E

Ec

E

Ec



1 PID

r

E

Ec

Δk_p

Δk_i

Δk_d

y

E

Ec

P I D

E

Ec

E Ec

P I D

1

[5]

7

{NB NM NS

ZO PS PM PB}

2

49

IF-THEN ELSE

ALSO OR

3

[6]

[7]

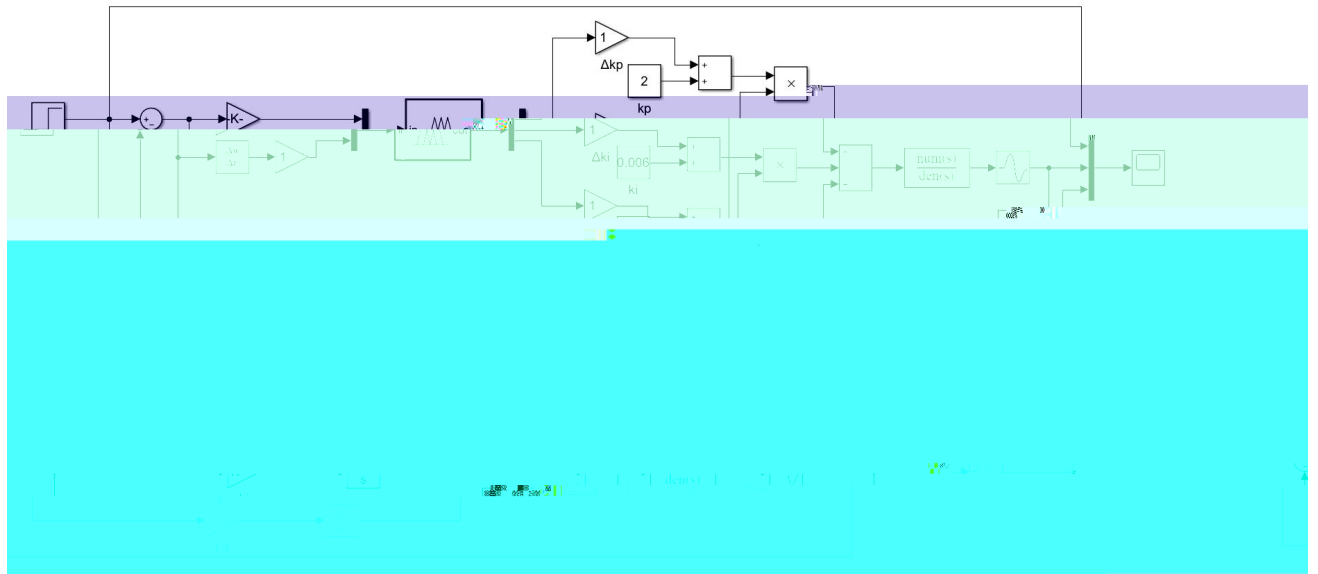
[8]

E Ec

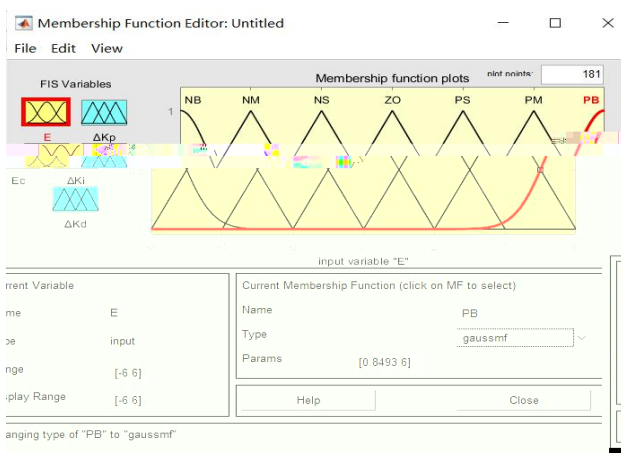
1 Δk_p								
E_c								
	NB	NM	NS	ZO	PS	PM	PB	
E	NB	PB	PB	PM	PM	PS	ZO	ZO
	NM	PB	PB	PM	PS	PS	ZO	NS
	NS	PM	PM	PM	PS	ZO	NS	NS
	ZO	PM	PM	PS	ZO	NS	NM	NM
	PS	PS	PS	ZO	NS	NS	NM	NM
	PM	PS	ZO	NS	NM	NM	NM	NB
	PB	ZO	ZO	NM	NM	NM	NB	NB

2 Δk_i								
E_c								
	NB	NM	NS	ZO	PS	PM	PB	
E	NB	NB	NB	NM	NS	ZO	ZO	
	NM	NB	NB	NM	NS	NS	ZO	ZO
	NS	NB	NM	NS	NS	ZO	PS	PS
	ZO	NM	NM	PS	ZO	PS	PM	PM
	PS	NM	NS	ZO	PS	PS	PM	PB
	PM	ZO	ZO	PS	PS	PM	PB	PB
	PB	ZO	ZO	PS	PM	PM	PB	PB

3 Δk_d								
E_c								
	NB	NM	NS	ZO	PS	PM	PB	
E	NB	PS	NS	NB	NB	NM	PS	
	NM	PS	NS	NB	NM	NS	ZO	
	NS	ZO	NS	NM	NS	NS	ZO	
	ZO	ZO	NS	NS	NS	NS	ZO	
	PS	ZO	ZO	ZO	ZO	ZO	ZO	
	PM	PB	NS	PS	PS	PS	PB	
	PB	PB	PM	PM	PS	PS	PB	



5 PID PID



2.2

Simulink

Simulink

5

PID

PID

k_p k_i k_d

PID

Δk_p Δk_i Δk_d

k_p 2 k_i 0.06 k_d 1

3

2.1.3

49

$$G(s) = \frac{1.8}{318s+1} e^{-3s} \quad (1)$$

PID

PID

PID

5

6

6

PID

20%

PID

30%

PID

PID

10%

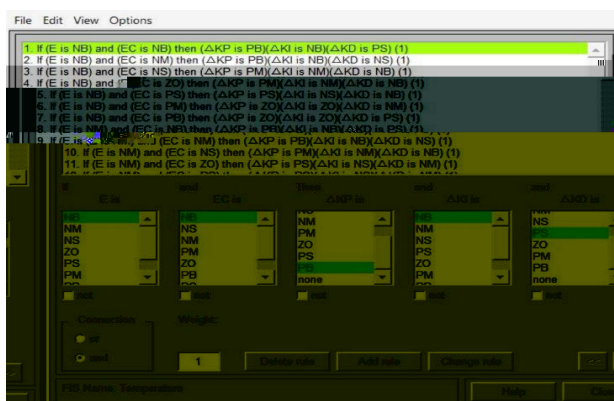
PID

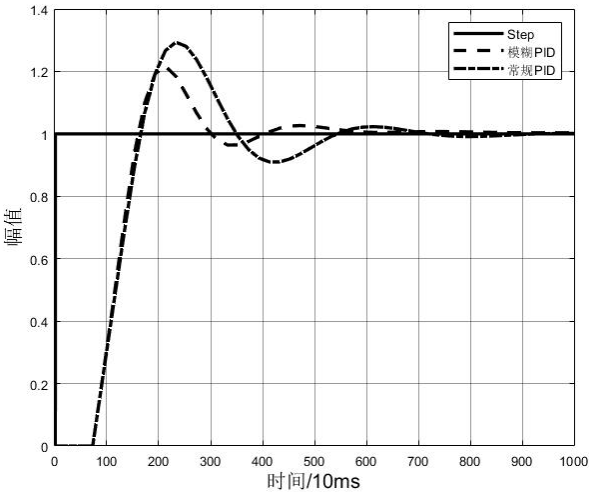
PID

PID

PID

4



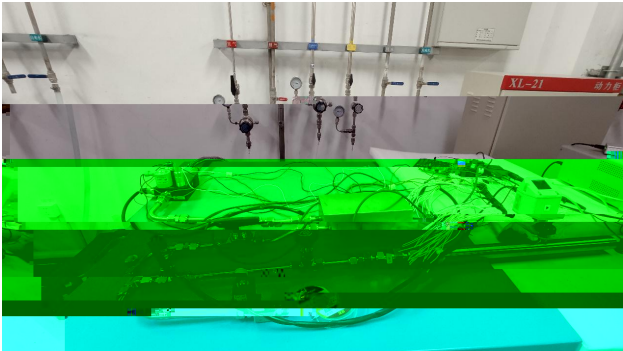


6 PID PID

3.1

35 MPa
MPa 1.5 MPa

0.8



7

PID PID

0.5 V~4.5

V
CAN PC PC
LabVIEW

8

8

p

”

PID



TK91 U473.8

A

1001-9006 2022 01-0018-04

Study on Optimal Ratio of Equal Mass Filling o j 9

[1]

[3-5]

0.895 m³

6

8.05 m³

35 MPa

2

20 MPa

45 MPa

“

”

45 MPa

“

”

“

”

MPa

45 MPa

45 MPa

“

”

“

”

9

“3:3:3” “2:3:4” “1:3:5”

2.1

1

7.5 MPa

5 kg

35 MPa

20 kg

0.87 m³

15 kg

2

9

0.895 m³

45 MPa

3

25 MPa

30 MPa

35 MPa

4 “ ”

P_{cr} 25 MPa

30 MPa

35 MPa

2.2

1

$PV=ZmRT$

1

$P-$ (Pa) $V-$ (m³) $m-$

(kg) $R-$ 4 214 J/ kg · K

$T-$ (K) $Z-$ =1+ $\alpha P/T$

$\alpha=1.9155\times10^{-6}$ K/Pa

20

m_x- kg

m_y- kg

m_z- kg

m_u- kg

$m_{cr}-$ kg $n-$

% P_0- Pa P_1-

Pa P_2-

Pa P_3- Pa

$P_{cr}-$ Pa V_0-

m³ V_1- m³

V_2- m³ V_3-

m³ V_c- m³

Z_1- Z_2-

Z_3- Z_c-

$N-$

m_c

$$\eta_c = P_c V_c / Z_c R T$$

2

$$= P_{cr} V_c / Z_{cr} R T$$

(

$$m_u) \cdot BR' \quad \& \quad Rr' U$$

$$\left(- \quad - \right)$$

3

$$4 - 6$$

$$\left(- \quad - \right)$$

$$Q' d' Q q \phi$$

p

$$\left(- \quad - \right)$$

5 2 2

“ ”



[1] , , . 35 MPa/70 MPa [J]. , 2020, 9(3): 702-706

[2] . 70 MPa [D]. , 2019

[3] , , . [J]. , 2020, 36(3): 97-101

[4] , , . [J]. , 2020, 36(3): 97-101

[5] . [R]. , 2019

” “ ”



10 microporous

[1] . — [M]. 2003

[2] . [M]. 2010

[3] Mandal P, Hong B K, Oh J G , et al. Understanding the voltage reversal behavior of automotive fuel cells[J]. Journal of Power Sources, 2018, 397(sep.1):397-404

[4] Hong B K, Mandal P, Oh J G, et al. On the impact of water activity on reversal tolerant fuel cell anode performance and durability[J]. Journal of Power Sources, 2016, 328(OCT.1):280-288

[5] Reiser C A , Bregoli L, Patterson T W, et al. A Reverse-Current Decay Mechanism for Fuel Cells[J]. Electrochemical and Solid-State Letters, 2005, 8(6) 273-276

[6] Spornjak D, Fairweather J, Mukundan R, et al. Influence of the

TK172 TM623

A

1001-9006 2022 01-0022-04

Research on Heat Transfer Property of Stainless Steel Rolling Fin Tube

YANG Yang

Dongfang Electric Co.,Ltd., 611731, Chengdu, China

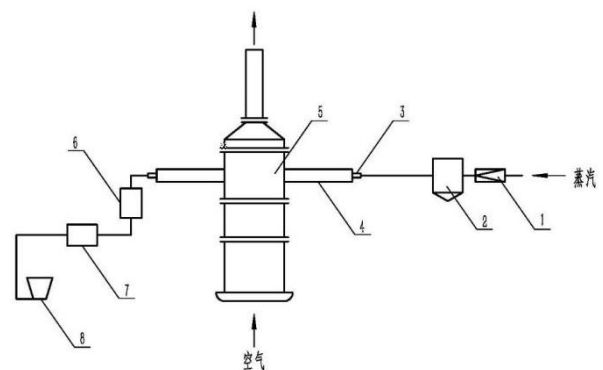
Abstract: In this paper, through the experimental study on heat transfer performance of stainless steel rolling fin tube, the relationship curve and formula of heat transfer coefficient are obtained, which effectively verifies the heat-transfer capability of stainless steel rolling fin tube.

Key words: stainless steel rolling fin tube; experimental study; effective verification; heat transfer capability

$D27\text{ mm}$

300 mm

1.2



1.1

4

A1 A2 B1 B2

$D25 \times 2.5\text{ mm}$

$D50.15$

mm

2.3 mm

0.5 mm

1-

2-

3-

4-

5-

6-

7-

8-

1

1

2021-10-18

1984

2008

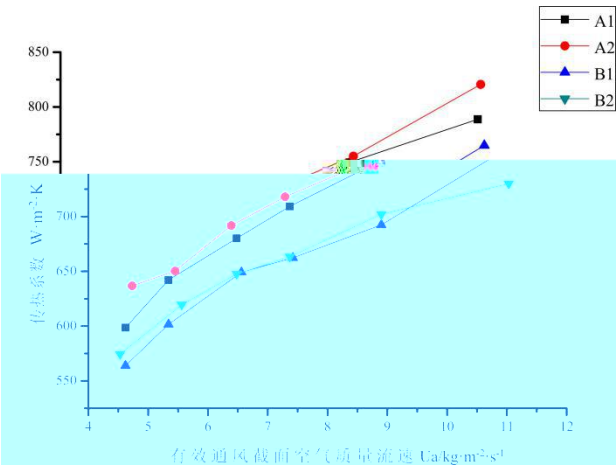
		1	2	3	4	5	6
	/	29.9	29.8	30.0	29.7	29.8	29.8
	/	61.28	59.3	56.65	54.54	51.97	49.8
	/ MPa	0.16	0.16	0.16	0.16	0.16	0.16
	/	114.0	113.9	114.2	114.6	113.7	119.0
	/	110.1	109.8	109.9	110.5	109.3	114.6
	/kg·h ⁻¹	1.461	1.595	1.712	1.852	1.949	2.301
	/ W	901.5	984.2	1 056.4	1 142.8	1 202.6	1 419.8
	/ kg·s ⁻¹	0.029 6	0.034 2	0.041 5	0.047 2	0.056 6	0.070 3
	/ kg·m ⁻² ·s ⁻¹	4.62	5.34	6.48	7.37	8.84	10.98
	/ W	933.5	1 013.9	1 111.5	1 178.3	1 261.1	1 413.0
	/ %	-3.43	-2.93	-4.96	-3.01	-4.64	0.48
	/	65.5	66.49	68.11	69.92	70.24	76.74
	/ w·m ⁻² ·K ⁻¹	598.6	642.1	680.1	709.3	749.5	788.8

2

	1	2	3	4	5	6
/	29.3	29.5	29.2	29.0	28.9	28.7
/	61.78	59.1	56.95	54.37	51.23	48.52
/ MPa	0.16	0.16	0.16	0.16	0.16	0.16
/	113.9	113.7	114.6	113.7	114.1	113.8
/	110.1	109.6	110.4	109.6	109.8	109.3
/ kg·h ⁻¹	1.556	1.599	1.759	1.851	2.022	2.244
/ W	960.1	986.7	1 085.4	1 142.2	1 247.7	1 384.7
/ kg·s ⁻¹	0.030 3	0.034 9	0.040 9	0.046 7	0.057 0	0.070 6
/ kg·m ⁻² ·s ⁻¹	4.73	5.45	6.39	7.29	8.60	11.03
/ W	989.1	1 038.2	1 140.6	1 190.7	1 279.2	1 406.3
/ %	-2.92	-4.96	-4.84	-4.08	-2.46	-1.54
/	65.42	66.54	68.75	69.42	71.51	72.67
/ w·m ⁻² ·K ⁻¹						

4B2

	1	2	3	4	5	6
/	28.4	28.5	28.3	28.3	28.05	27.8
/	59.47	56.03	53.51	51.39	48.69	46.17
/ MPa	0.16	0.16	0.16	0.16	0.16	0.16
/	114.2	113.9	114.6	113.8	114.2	115.5
/	110.3	109.9	110.4	109.6	109.9	110.9
/ kg·h ⁻¹	1.468	1.644	1.787	1.819	1.991	2.096
/ W	905.8	1 014.4	1 102.7	1 122.4	1 228.6	1 293.3
/ kg·s ⁻¹	0.029	0.035 6	0.041 5	0.047 2	0.057 0	0.070 6
/ kg·m ⁻² ·s ⁻¹	4.53	5.56	6.48	7.37	8.90	11.03
/ W	905.5	985.0	1 051.4	1 095.3	1 182.4	1 303.4
/ %	0.03	2.99	4.87	2.48	3.91	-0.77
/	67.38	68.97	71.08	71.44	73.38	76.01
/ w·m ⁻² ·K ⁻¹	574.5	619.5	647.6	663.3	702.1	730.0



NB/T 47007-2010

7

$$\frac{1}{K^*}=\frac{1}{K}-\frac{\delta}{\lambda}+\frac{\delta}{\lambda^*}$$

7

2			$K \cdot U$		
$K \cdot U$			A1		
A2	B1	B2	6		
$K \cdot U$			$U=6 \text{ kg}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ K		
A1	$K=375.8U^{0.314}$		0.4%	$659.6 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}$	
A2	$K=394.0U^{0.302}$		0.34%	$676.9 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}$	6
B1	$K=344.8U^{0.328}$		0.5%	$620.6 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}$	
B2	$K=389.2U^{0.267}$		0.38%	$628.0 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}$	

K*

K:

λ*

λ

Delta

delta
/ delta
kW delta
delta
TM311 A 1001-9006 2022 01-0026-03 7 200

Application of Stator Delta Connection in Large Motor

FENG Deyang

Dongfang Electric Machinery Co., Ltd., 618000, Deyang, Sichuan, China

Abstract Delta connection of stator is easy to produce the third harmonic circulating current in stator winding, increase the loss and cause heating. The classical theory of electrical machinery does not recommend delta connection in high-power motor. However, delta connection can effectively reduce the power supply voltage on the premise of keeping the motor phase voltage unchanged. Also, by changing the star / delta connection, the same motor can adapt to different voltage levels. It can be seen that delta connection still has application prospect in high-power motor. In this paper, taking 7 200 kW motor as an example, we demonstrates the focus of delta connection application, and proves its feasibility in high-power motor application through industrial application.

Key word: delta connection; third harmonic; circulating current

delta
delta
delta
delta 7200kW

delta delta

1.1

$$E_{\varphi v} = 4.44 f_v N k_{wv} \Phi_v \quad (1)$$

$$f_v = v f_1$$

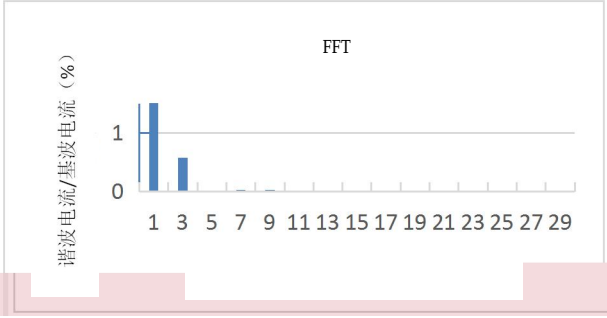
$$v = \frac{N}{N}$$

2021-05-03

1989

2014

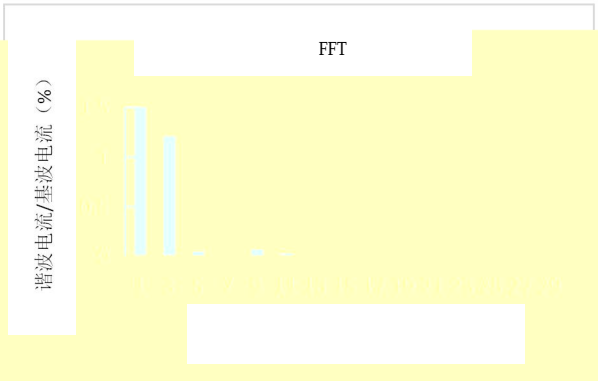
	k_{wv}	v			2.1	
v			Φ_v			
v				q		
	$\Phi_v=\frac{2}{\pi}B_v\tau_vl$		2			
	B_v	v	τ_v		7 200 kW	
v		l/v	l		1 500 mm	
		delta	Y		120	4
v			$v\alpha$	10		
				1	2.2	
		Y				
	delta					
delta						7 200 kW
	1	2		4	5	
					5	
$I_{3\Delta}$						
	$I_{3\Delta}=\frac{3E_{\phi 3}}{3Z_3}$		3		2.3	
	$3E_{\phi 3}$	delta		delta		
	$3Z_3$			4		120/101 96/77
						7 200 kW
1.2						
	1.1		delta	FFT		120/101
						0.57%
						120/101
				1		
				1	96/77	
					1.21%	
	delta			96/77		2
					2	



1 120/101

1 120/101

A			A		
1	1 263.03	100.00%	11	0.09	0.01%
3	7.2	0.57%	13	0.05	0.00%
5	0.08	0.01%	15	0.05	0.00%
7	0.35	0.03%	27	0.17	0.01%
9	0.32	0.03%	29	0.13	0.01%



2 96/77

2 96/77

A			A		
1	1 245.15	100.00%	11	0.34	0.03%
3	15.01	1.21%	13	0.07	0.01%
5	0.67	0.05%	15	0.12	0.01%
7	0.06	0.00%	27	0.15	0.01%
9	0.81	0.07%	29	0.14	0.01%

120/101

0.57%

120/101

0.57%

2.4

45

0.01 mm



7 200 kW

3

2018 12

5 400 kW

3

BPY7200-4	7 200 kW	3	4	2 900 V
33.52Hz	1 000 rpm	delta	S1	

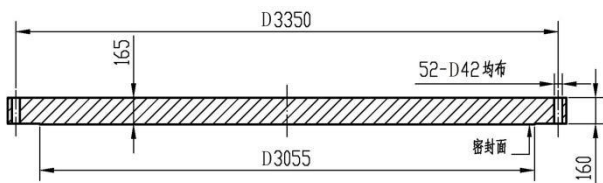
2

29

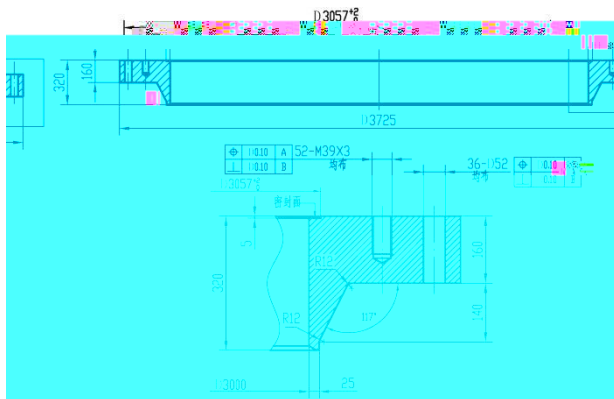
GB/T150.3

1.1

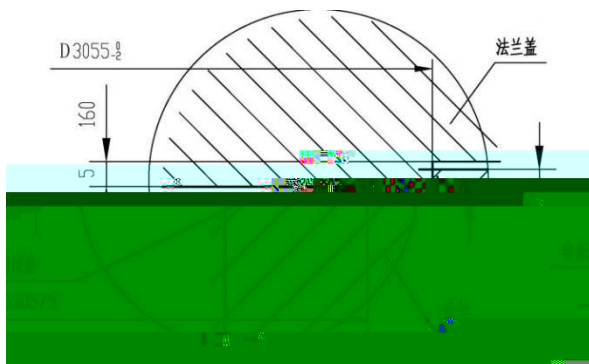
165 mm 160 mm 1
D3000 160 mm 2
D3350 M39 52
83 D3055/ D3005
3
1 1.13 MPa



1



2



3

1

		(MPa)
SA-965 F316		130.41
SA-965 F316		130.41
SA-193 B7		172
304+	m=2 y=22.8MPa	

1.2

NB/T 47024-2012

DN3000 D3055/D3005 PN
0.25 MPa 1.15 MPa

HG/T 20592-2009

DN2000 PN1.6 MPa

D2230 NB/T 47024-2012 DN2000

PN1.6 MPa D2089/D2029

70.5 mm,

$b_0=15 \text{ mm}$

GB/T150-2011

$D_G=$

$-2b=2\ 089-2\times 2.53\times \sqrt{15}$

$=2\ 069.4 \text{ mm}$

$D_G\ 80.3 \text{ mm}$

$b_0=12.5 \text{ mm}$

$D_G=3\ 055-2\times 2.53\times \sqrt{\quad}<$

[2]

D_G

1.2

Waters



3.1

1

[3]

$$Q=\frac{9.8\ h^3\ p}{13.9\ \lg_{10}(r_2/r_1)}\times 10^5\ \text{cm}^3/\text{s}\quad 1$$

h - cm

p - MPa r_1 - cm

r_2 - cm η - $\text{Pa}\cdot\text{s}$

1 p η

r_2/r_1 1 h

3.2 $m\ y$

0.9

K 0.24

2 $m\ y$

K 0.13

4y $F=2\pi D_G b m p$

$$/4\times D_G^2 p_c$$

$$2\pi D_G b m p$$

3 $m\ y$

3.3 D_G

$$2\pi D_G b m p$$

MFM

4

D_G

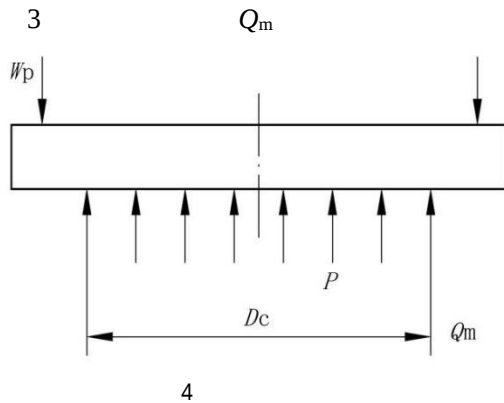
“ ” [4] GB 150-1989

$$D_C=2R_C,$$

$$h_G,$$

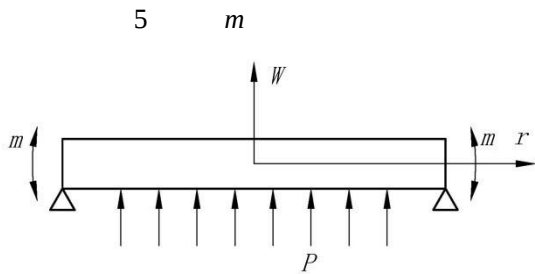
$$p \quad W_p \quad 4$$

$$\begin{matrix} 1 & p \\ 2 & W_p \end{matrix}$$



4

$$Q_m$$



5

$$W = \frac{p(R^2 - r^2)}{64D} \left(\frac{5+\mu}{1+\mu} R^2 - r^2 \right) + \frac{m}{2(1+\mu)D} (R^2 - r^2)$$

p - MPa R - mm r - mm

$$D = \frac{E \delta^3}{12(1-\mu^3)} \quad \delta-$$

D - mm E - μ - m -

$$m = \frac{M}{D_c}$$

4.1

Waters

Waters

$$8\,567\,754\text{ N} \quad m \quad 143\,678$$

$$N \cdot mm, \quad 1.13\text{ MPa} \quad 2$$

$$D_G \quad 1.35\text{ mm}$$

$$3.5\text{ mm} \quad 42\%$$

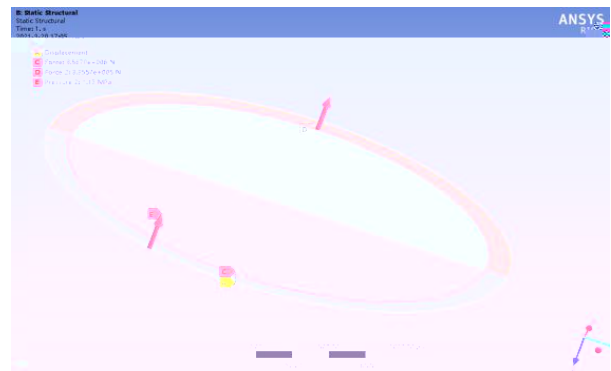
$$12\% \quad 3.5 \times 0.42 \times 0.12 = 0.176$$

$$mm \quad 2$$

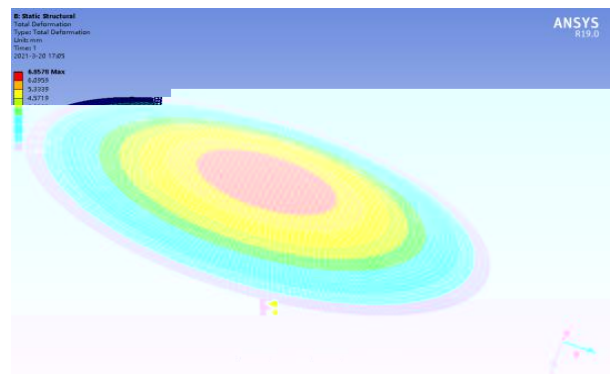
4.2

6

7



6



7

$$1.245\text{ mm}$$

7%0.176

mm

D_G

1

D_G

1

2

2

2

3

D_G

Waters

mm

D3250/D3300

b

2

0.235 mm

9 972 196 N

m

32 884 N·mm

0.214 mm

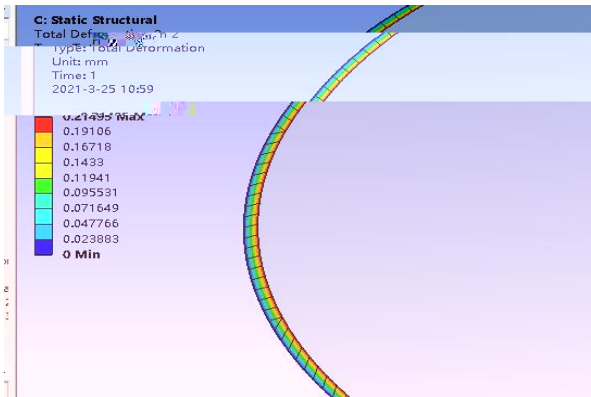
8

$5\times0.42\times0.12=0.252\text{mm}$

3

5

4



8

[1] . 2013(10): 1468-1471 [J].

[2] . [J]. 2014 35(2): 57-61+8

[3] . [J]. , 2008 29(2), 63-66+24

[4] GB150-89 [S]

[5] . WATERS [J]. 2014 35(2):1-2+5



R317

A307

12Cr1MoVG

1Cr20Ni14Si2

TG44 TM621.2

A

1001-9006 2022 01-0034-05

Study on Welding Technology of Dissimilar Steel for Pressure Bearing Pipe and Non Pressure Annex of Boiler

LI Wenhui, YIN Runbang, ZENG Hui, ZENG Huiqiang, PAN Yi

Dongfang Boiler Group Co., Ltd., 643001, Zigong, Sichuan, China

Abstract: In this test, the welding of pearlitic steel pressure parts and austenitic steel non pressure parts in boiler superheater and reheater components was studied. The joints of pearlitic steel (12Cr1MoVG) and iron-based austenitic stainless steel (1Cr20Ni14Si2) were welded with R317 electrode and A307 electrode respectively, and the microstructure and microhardness of the fusion zone formed by welding were studied and analyzed. It is concluded that the selection of pearlitic steel welding materials for dissimilar steel welds of pearlitic steel pressure parts + iron-based austenitic stainless steel non pressure parts is more conducive to ensure the safety of product operation.

Key word: pearlitic steel; austenitic steel; dissimilar steel; fusion zone; microstructure

12Cr1MoVG 15CrMoG

1Cr20Ni14Si2 1Cr18Ni9Ti



1.1

[1]

12Cr1MoVG D51×8

1Cr20Ni14Si2 δ6

1

2

2021-11-05

1968

1987

1							Wt%
	C	Si	Mn	Cr	Mo	V	Ni
12Cr1MoVG	0.12~0.15	0.20~0.25	0.60~0.70	1.0~1.2	0.28~0.30	0.20~0.25	/
1Cr20Ni14Si2	0.12~0.15	2.2~2.4	1.0~1.2	21.0~21.6	/	/	13.0~13.2

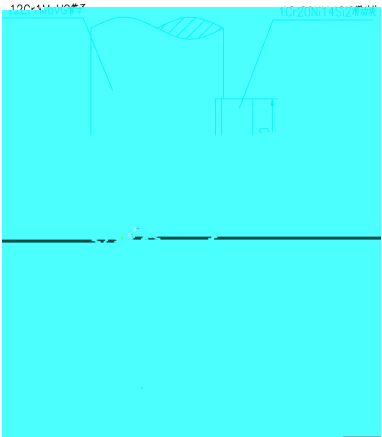
2										Wt%
	C	Si	Mn	P	S	Cr	Mo	V	Ni	Cu
R317	0.05-0.12	≤ 0.60	≤ 0.90	≤ 0.035	≤ 0.035	0.80~1.50	0.40~0.65	0.10~0.35		
A307	≤ 0.15	≤ 0.90	0.5~2.5	≤ 0.040	≤ 0.030	22.0~25.0	≤ 0.75		12.0~14.0	

1.2

1.2.1

12Cr1MoVG1Cr20Ni14Si2
1
A B C D,A B R317
C D A307

, 3

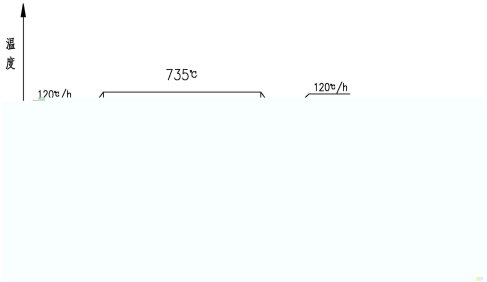


1

3						
		(A)	(V)	(mm/s)		
A	12Cr1MoVG+ 1Cr20Ni14Si2	R317, φ3.2	120~125	22	2.4~2.6	
					1.6~2.1	
B	12Cr1MoVG+ 1Cr20Ni14Si2	R317, φ3.2	120~125	22	2.4~2.6	
					1.6~2.1	
C	12Cr1MoVG+ 1Cr20Ni14Si2	A307, φ3.2	90~100	22	2.4~2.6	
					1.6~2.1	
D	12Cr1MoVG+ 1Cr20Ni14Si2	A307, φ3.2	90~100	22	2.4~2.6	
					1.6~2.1	

1.2.2

2



2

2.1

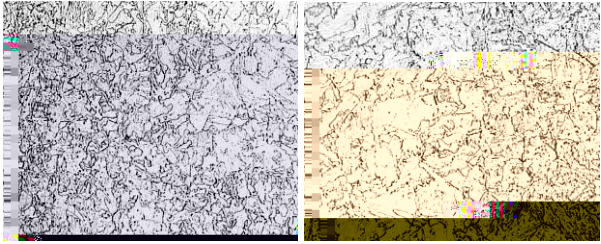
2.1.1

A B C D

3~ 6

R317

A307



3 A

4 B

	1	1	2

1.2

1

Java Go C++ Python
TCP

2

[3]

3

UI CPU

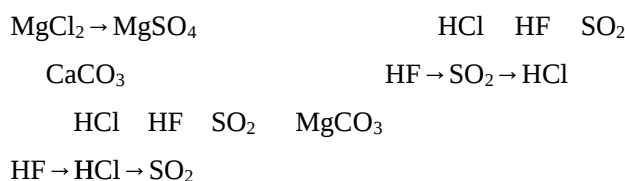
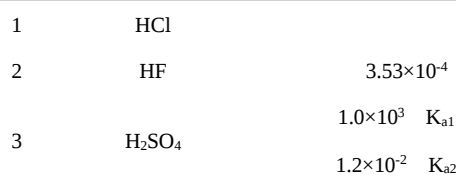
1,2

1001-9006 2022 01-0043-03

LV Lidan¹, YANG Zhizhong^{1,2}

2. Dongfang Boiler Group Co., Ltd., 611731, Chengdu, China

i



	2 CaCO ₃	MgCO ₃	CaF ₂	MgF ₂
	(g/100mL H ₂ O) ^[6]			K _{sp}
1	CaCO ₃		0.001 3	8.8×10 ⁻¹²
2	MgCO ₃		0.01	6.7×10 ⁻⁹
3	CaF ₂		0.001 5	2.8×10 ⁻¹¹
4	MgF ₂		0.013	3.6×10 ⁻⁸

TM315

A

1001-9006 2022 01-0046-04

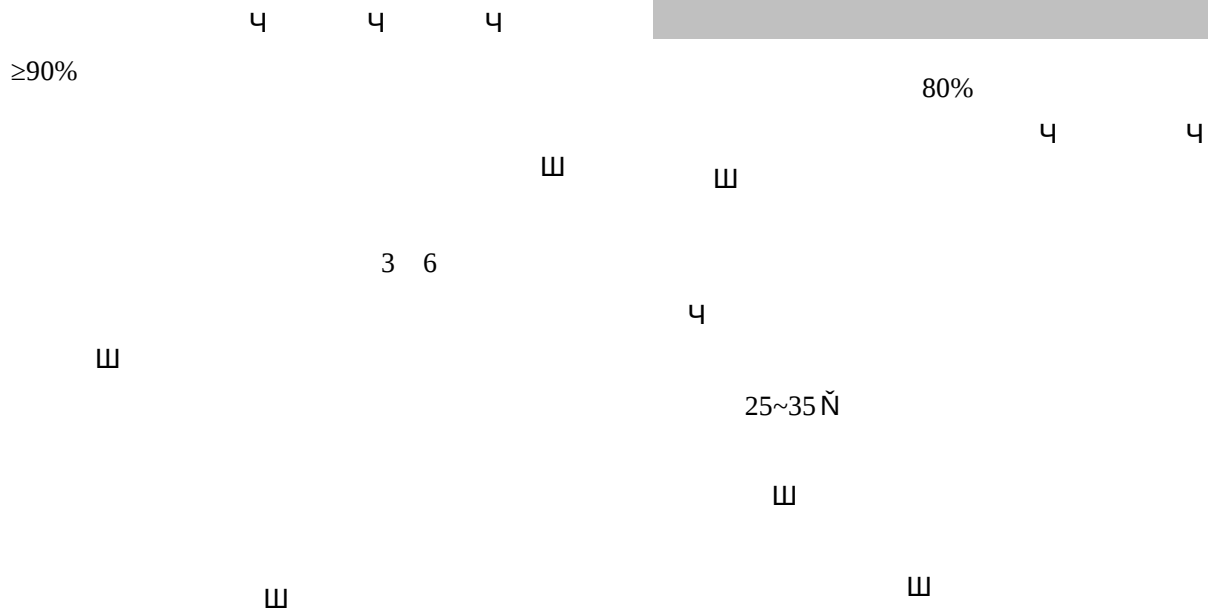
Discussion on Corrosion Protection for Long-term Transport and Storage of Offshore Wind Turbines

LIU Guilin

Dongfang Electric Wind Power Co., Ltd., 618000, Deyang, Sichuan, China

Abstract: Offshore wind turbines generally experience a long period of maritime transportation and storage, the marine weather is changeable, humidity is large, salt spray is heavy, and the metal and electrical components in the unit face a great risk of corrosion, so it is more important for the protection of the unit in the transportation and storage process. This paper puts forward some empirical suggestions for the protection measures in the transportation and storage of wind turbines for reference in the industry.

Key words: wind turbines; transport; storage; corrosion protect



2021-12-28

1983

2007

山

2.2

2.2.1

4

4

4

4

4

4

4

4

4

6 12

4

4

4

4

2.2.2

4

4

4

4

4

4

2.2.3

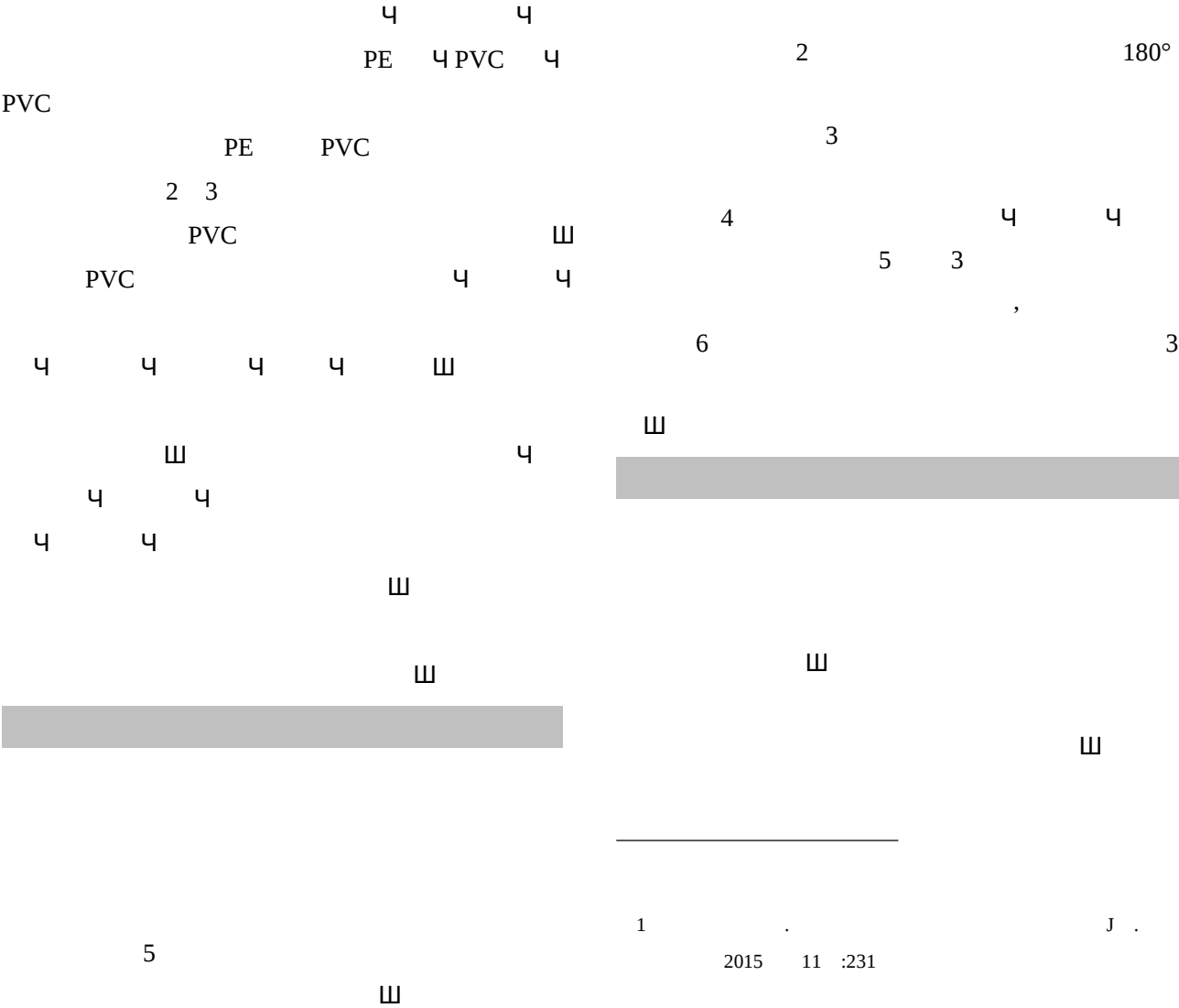
+

+

4

4

2.2.6



25		6 kg/m ² ·s	
K^*		$D\ 25\times 2.5\ \text{mm}$	2.3 mm,
A1	716.5 W/(m ² ·K)	650 W/m ² ·K W	
A2	737.0 W/(m ² ·K)	A1 U A2 U B1 U B2	
B1	670.7 W/(m ² ·K)	716.5 W/(m ² ·K) U	
B2	679.4 W/(m ² ·K)	737.0 W/(m ² ·K) U 670.7 W/(m ² ·K) U 679.4 W/(m ² ·K)	
NB/T 47007-2010		650 W/m ² ·K W	
110 N		W	

1 2 2 1

200

BLADED

TM315 TK83

A

1001-9006 2022 01-0050-06

The Influence of Trailing Edge Serrations on Aerodynamic Performance of Wind Turbine

ZENG Mingwu¹, YANG Junwei², SUN Zhenye², WU Xinbo¹

1. Dongfang Electric Wind Power Co., Ltd., 618000, Deyang, Sichuan, China

2. Yangzhou University, 225127, Yangzhou, Jiangsu, China)

Abstract: With the transfer of wind farm from northwest, northeast, and north of china area to southwest mountainous area and coastal area in China, and the diameter of wind turbine exceedsd 200 meters, the noise problem of wind turbine is more and more serious. Trailing edge serration is the most commonly used passive noise reduction accessory of wind turbine blades, but it also leads to changes in the aerodynamic performance and load of wind turbine. Wind tunnel tests of lift, drag and surface pressure distribution of airfoil were carried out in Yangzhou University low-speed wind tunnel to verify the influence of different trailing edge serrations on the aerodynamic performance of airfoil. Using large-scale wind turbine design and analysis software BLADED, and the influence of trailing edge serrations on the aerodynamic performance of wind turbine is discussed, and evaluates the influence of serration on the steady-state load of the blade root. The results show that the trailing edge serrations can improve the aerodynamic performance of the wind turbine, but increase the steady-state load of the blade root.

Keywords: wind turbine; trailing edge serrations; wind tunnel testing; aerodynamic performance

2~2.5

2021-03-03

2020CKC002

1983

2006

CFD

NACA63418

21%

[1]

NACA0018

600 mm

1.5 m

1

$$h \quad \lambda$$

[2]

Fluent

$$W$$

[3]

 λ $2h$

NACA0018

[4]

$$W$$

2

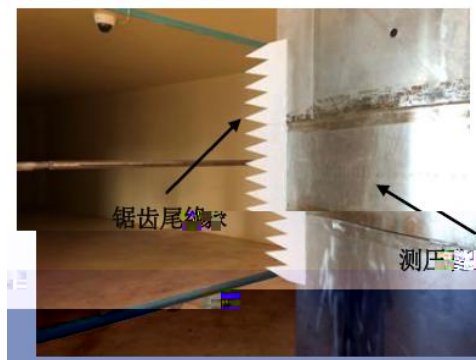
$$U$$

[5]

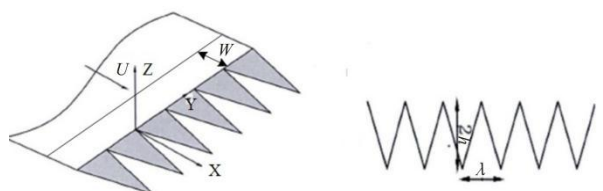
DU97-W-300

CFD

[6]



1



2

MW

$$h \quad \lambda$$

BLADED

$$/ \quad \lambda/h$$
 λ/h λ/h

1.1

[7]

3

 λ/h

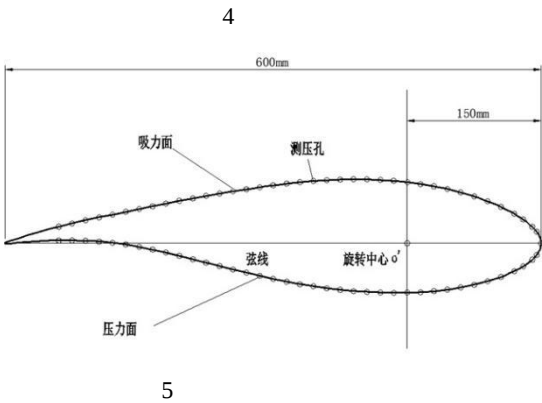
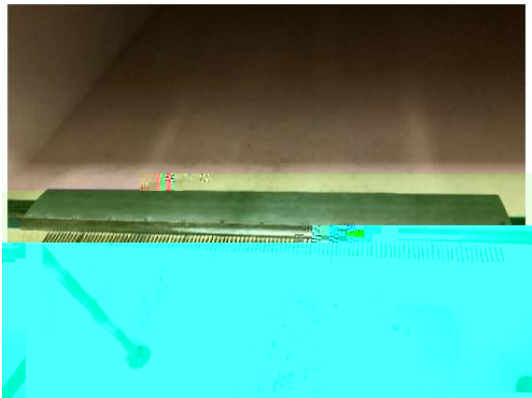
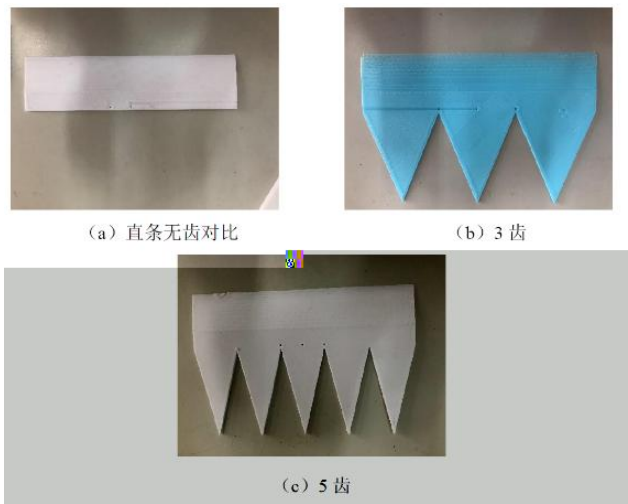
5/6

 $1/2$

1

$$h$$
 λ

1					
		2h (mm)	λ (mm)	λ/h	w(mm)
1	3	90	75	5/6	20
2	5	90	45	1/2	20
3		0	0	-	20



3

1.2

PSI

64

256

3 cm×3 cm

1.3

333.3 Hz

15 000

4

0.7

102

1.2

mm

4

2 mm

Re

8.0×10^5

6

6 a

6 b

$Re=8.0\times 10^5$

0.19

7

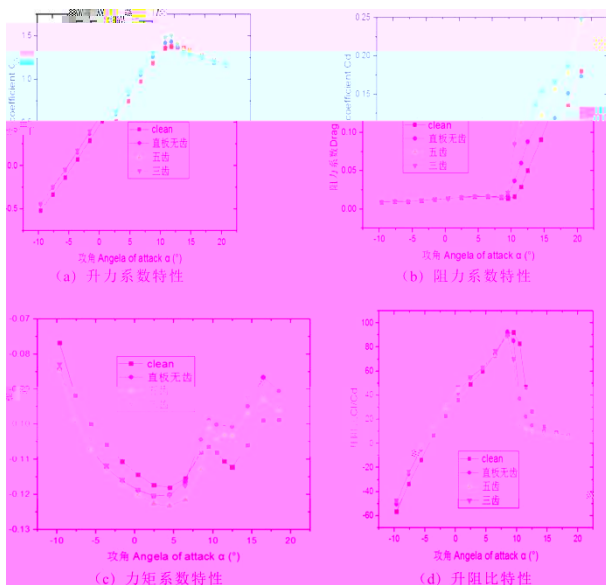
7 a

6 c

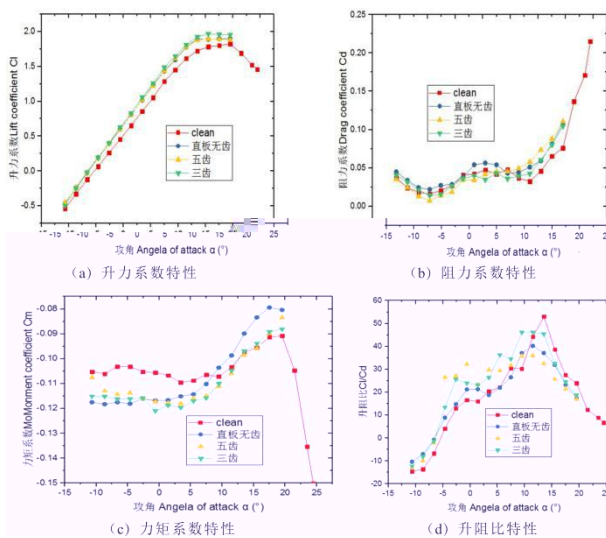
15°

6 d

$0^\circ\sim 10^\circ$



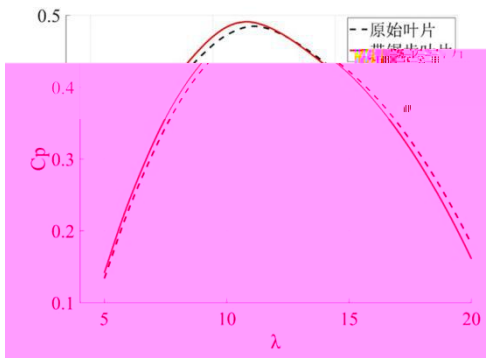
6 $Re=8\times 10^5$



7 $Re=8\times 10^5$

0.19

2.1	C _p			
	2.5 MW	7 MW		
	C _p		2	8
	2.5 MW		3%	
	7 MW	1.2%	C _p	
	2		C _p	
	2.5MW	2.5 MW	7 MW	7 MW
	0	0.5	0	0.2
	C _p	0.481	0.495	0.485 0.491



2.2

2.5 MW

7 MW

3

4

1.225 kg/m³

3 m/s

25 m/s

75%

k

2

2.5 MW

0.5%~2.5%

1.5%

7 MW

0.5%~1.5%

1%

3

2.5 MW

[m/s]	[MWh/a]	[MWh/a]	/ [-]
3	1 072	1 099	102.5%
4	2 634	2 693	102.2%
5	4 574	4 654	101.8%
6	6 477	6 564	101.4%
7	8 132	8 218	101.1%
8	9 490	9 570	100.8%
9	10 561	10 633	100.7%
10	11 360	11 427	100.6%

4		7 MW	
[m/s]	[MWh/a]	[MWh/a]	/ [-]
3	2 133	2 165	101.5%
4	5 449	5 524	101.4%
5	10 000	10 126	101.3%
6	14 907	15 068	101.1%
7	19 490	19 666	100.9%
8	23 451	23 626	100.8%
9	26 698	26 866	100.6%
10	29 218	29 373	100.5%

2.3				
	2.5 MW	7 MW		
	0		5	6
	1.225 kg/m ³		3~25	
m/s				
		2.5 MW		
M_{x-min}	2.8%	7 MW		
M_{xy-max}	3%			

5		2.5 MW		
	-	/		
<i>M_x-max</i>	[kNm]	—	—	—
<i>M_x-min</i>	[kNm]	-596	-613	102.80%
<i>M_y-max</i>	[kNm]	5 368	5 384	100.30%
<i>M_{xy}-max</i>	[kNm]	6 613	6 659	100.70%
<i>M_z-max</i>	[kNm]	21	21.3	101.50%

6		7 MW		
	-	/		
<i>M</i> _x -max	[kNm]	—	—	—
<i>M</i> _x -min	[kNm]	-596	-613	102.80%
<i>M</i> _y -max	[kNm]	5 368	5 384	100.30%
<i>M</i> _{xy} -max	[kNm]	6 613	6 659	100.70%
<i>M</i> _z -max	[kNm]	21	21.3	101.50%



BLADED

$Re=8.0 \times 10^5$ $0^\circ \quad 10^\circ$ $Re=8.0 \times 10^5$

-5° 0°

1~1.5%

4

[1]

42

P

,2013,34(5):870-873

2

,2017,32(4) 900-907

2

,2019,212(1) 15-20

.

[D

[D].

•

[D]

Howe M S. Aerodynamic noise of a serrated trailing edge[J].
Journal of Fluids & Structures. 1991. 5(1):33-45

LU Lin, YANG Hongxing, Burnett J. Investigation on wind power potential on Hong Kong islands: An analysis of wind power and wind turbine characteristics[J]. Renewable Energy, 2002, 27(1): 1-12

Noda M, Flay R G J. A simulation model for wind turbine blade fatigue loads[J]. *Journal of Wind Engineering and Industrial Aerodynamics*. 1999, 83(1/3): 527-540

Maalawi K Y, Badawy M T S. A direct method for evaluating performance of horizontal axis wind turbines[J]. Renewable & Sustainable Energy Reviews, 2001, 5(2): 175-190

,2003,27(5):51- 54

[M].

,2020

于 Storm 与 Kafka
与 [J]. 业, 2021, 34(5): 33-34+36

于

[M]. 京

[M]. 京 业

与

欢迎投稿，欢迎订阅！

M701F4

APS

*

- M701F4 , , M701F4
, (APS) L ∞
L APS, ∞
ñ ñ L
APS
TM611.31 A 1001-9006 2022 01-0056-06

Automatic Power Plant Start-up & Shut Down System Scheme Design of M701F4 Gas Turbine Combined Cycle Unit

DONG Yihua, XU Bo*

(Dongfang Electric Co., Ltd., 611731, Chengdu, China)

Abstract In this paper, through the research on the one button auto start stop scheme of Dongfang Mitsubishi M701F4 gas turbine combined cycle unit, combined with the gas turbine sequence control and combined cycle configuration scheme, and referring to the actual engineering experience, the overall scheme and main control process of one key self start and stop of this type of gas turbine combined cycle single shaft unit are sorted out, A preliminary design scheme for APS of M701F4 one driven one single shaft combined cycle unit is proposed. By introducing the overall design, breakpoint setting and function grouping of one button auto start stop, the general idea and main difficulties of implementation are analyzed. The final purpose is to realize APS of the unit, reduce the manual intervention in the process of unit startup and shutdown, improve the level of automatic operation and control of the unit, and provide necessary conditions for the final realization of "unattended" unit.

Keywords: gas turbine combined cycle; automatic power plant start up & shut down wntrd System; APS; functional groups; breakpoint;

(APS

automatic power plant start up&shut down system)

1.1

[1]

2021-12-28

1987

2013

1982

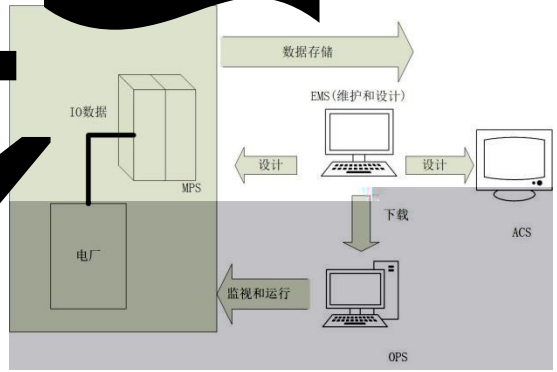
2008

xubo@dongfang.com

[2]

1.2

1.3



1 DIASYS Netmation

DIASYS Netmation

t



2.1 --DIASYS Netmation

DIASYS Netmation

DIASYS Netmation

1 MPS I/O

2 OPS

3 EMS DIASYS
MPS

OPS

ORCA

4 Browser OPS DIASYS Netmation

OPS

5 ACS T

6 CPS smart CPU

MPS



APS

M701F4 - APS

APS APS

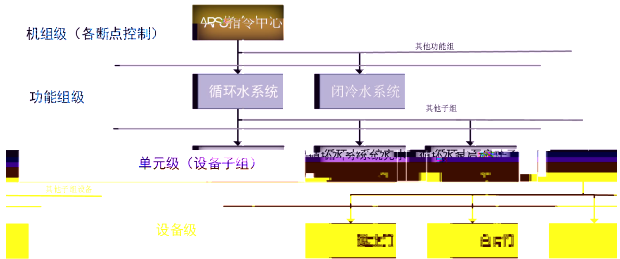
·
·
·

APS “ ”

3.1

APS 2

DIASYS Netmation



DEH

HRSG

DCS

ẽ

2 APS

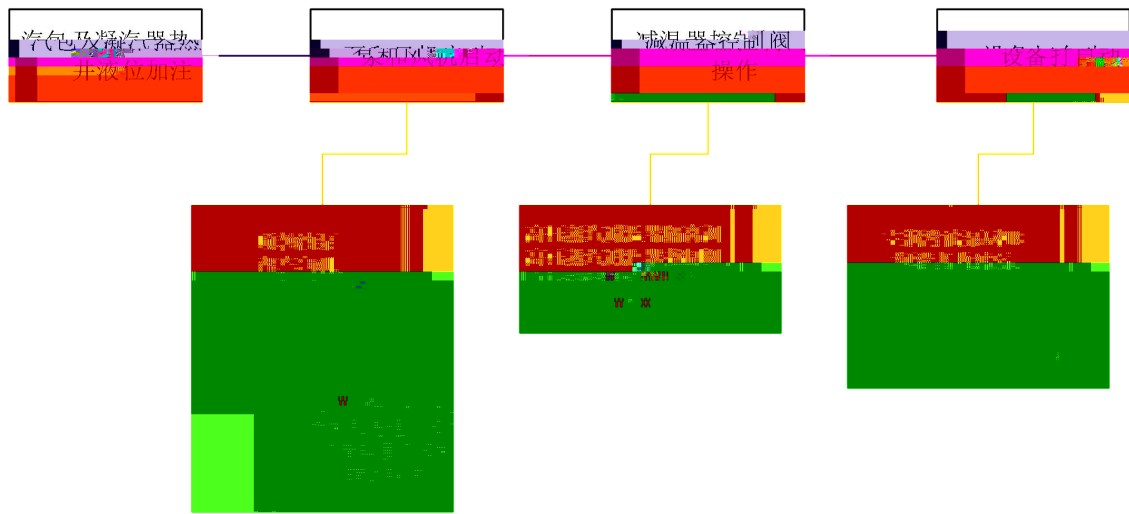
2 APS

2 APS

[3]

1

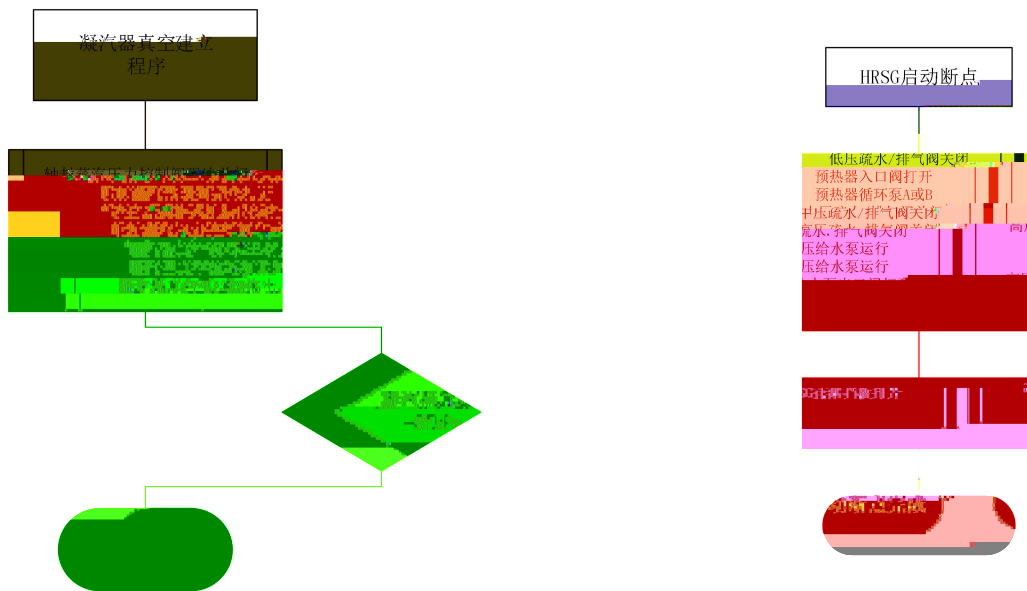
4



4

2

5



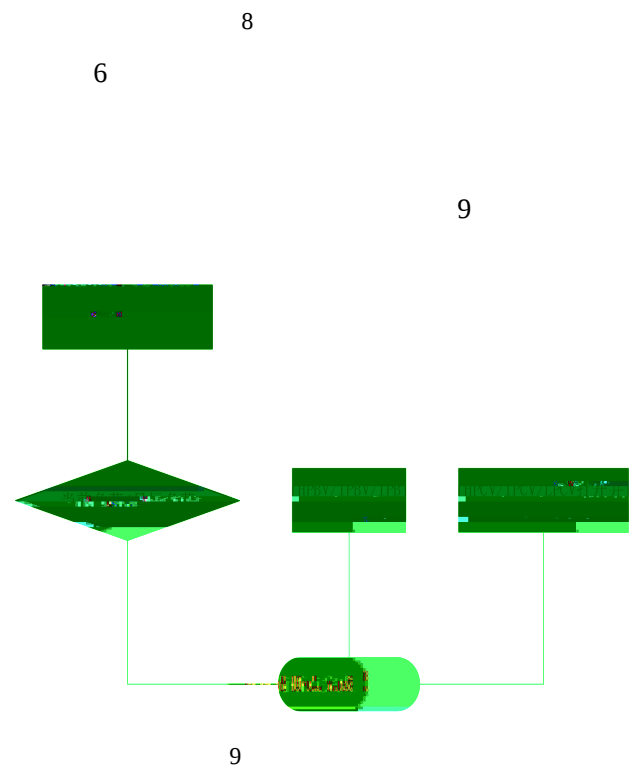
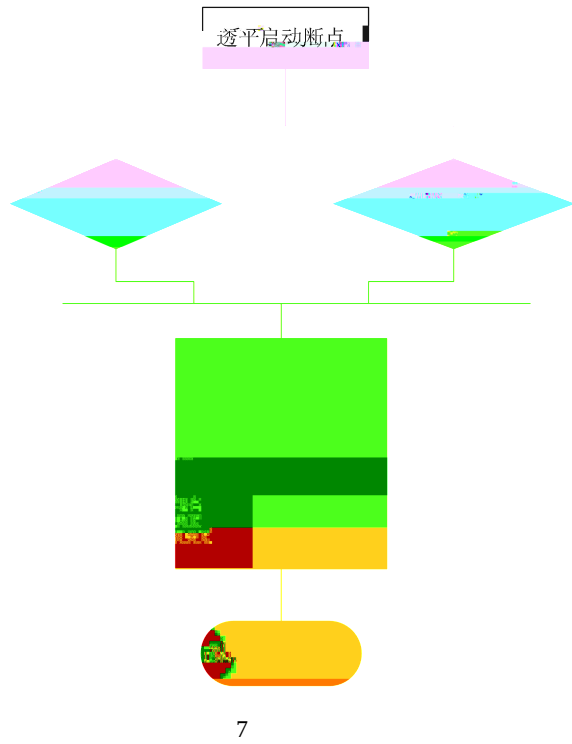
5

3 HRSG

4

6

7



5

3.2

M701F4

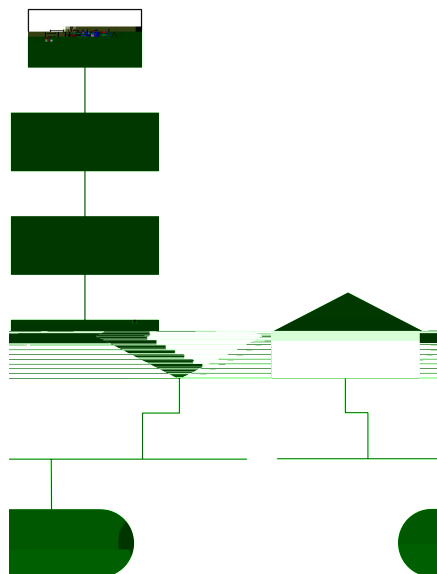
3

1.

2.HRSG

3.

8



3.3 APS

APS

APS

10



10 APS



1

2
DCS DCS

3

[1] . APS [J]. ,2015,39(4):71-73

[2] , .APS DCS [J]. ,2006,34(2):51-53

[3] . [D]. 2017

[4] Gas turbine combined cycle power generationg project turbine start and stop procedure. Mitsubishi Heavy Industries, LTD.

HAF602

1

2

HAF602

HAF602

TL

A

1001-9006 2022 01-0062-04

How to Manage the Transition Period Based on the Analysis of the Difference between the Old and New HAF602

WANG Xingxing¹ LUO Wei²

1.Dongfang Electric Co. Ltd., 611731, Chengdu, China

2.Dongfang (Guangzhou) Heavy Machinery Co., Ltd., 511455, Guangzhou, China

Abstract: In order to adapt and meet the requirements of the new regulations, ensure the smooth transition of the team construction of nuclear safety equipment nondestructive testing personnel in the reform, reduce the risks and impact brought by the changes of the old and new regulations, and improve the equipment manufacturing quality management ability, the author commits to analyze and discuss the coping strategies puts forward suggestions on how to manage the transition period of new and old qualifications through comparing the differences between the old and new HAF602, and the significance of regulatory amendments.

Key words: HAF602; nondestructive examination; comparison between the old and the new; qualification management; transition period

2020 12

Ò Ò

2021-11-15

1984

2013

HAF602 2019 6 13 45 30
,2020 1 1 “ ”
“ ”

1.2



HAF602 HAF602

1 I I

2

2019 HAF602 2007

3

1.1

1.3

HAF602 I

HAF602

HAF602

I 2 5

2019

“ ”

1.4

8 2 4

1

2

1.5

HAF602

HAF602

HAF602

1.6

HAF602

1

6.9%

1

88.8% I

4.2%

HAF602

1

PT 23.1% VT 12.8% MT 7.7% ET 2.5% LT RT 28.2% UT 25.6%

1.7

HAF602

LT-

10%

10%

“

”

1

“

2

3

”

4

1

2019

HAF602

“2020

1 1

4.1

2020 1

1

”

4.2

ET LT 2~3

1 of 1 P HAF602

HAF602

4.3 III

HAF602

某换热器承压边界传热系数计算

CFD

CFD

TM623 TK124

A

1001-9006 2022 01-0066-05

Calculation of Heat Transfer Coefficient at Pressure Boundary of A Heat Exchanger

LI Chao, WANG Bo, YANG Yang, GUO Zhengrong, CAO Xuefan, JIANG Fengming

Dongfang Electric Co., Ltd., 611731, Chengdu, China

Abstract Pressure boundary heat transfer coefficient is an important input condition for structural safety evaluation of nuclear heat exchanger. Through the demonstration of single tube model method, this paper determines the solution method of pressure boundary heat transfer coefficient suitable for engineering application. On this basis, the CFD simulation of a special-shaped structure with pressure boundary of a nuclear stage heat exchanger is carried out. The analysis shows that the distribution deviation of heat transfer coefficient in and out of the oral cavity of the heat exchanger is great, and the value method of heat transfer coefficient in and out of the oral cavity under different flow and temperature conditions is given. The data obtained in this paper can provide reference for the calculation of heat transfer coefficient at pressure boundary and provide key input reference for structural safety evaluation.

Key words CFD; method demonstration; heat transfer coefficient; heteromorphic structure

CFD

/

1

CFD

[1]

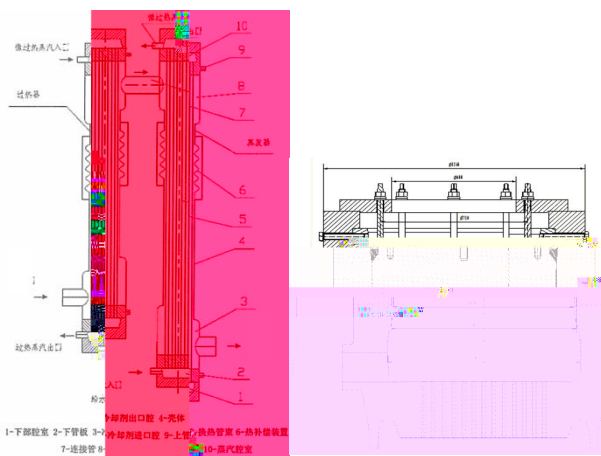
[2]

2021-11-10

1985

2021

lichao@dongfang.com



1
CFD

Dittus—Boelter

$$Nu=0.023Re^{0.8}Pr^{0.4}$$

1

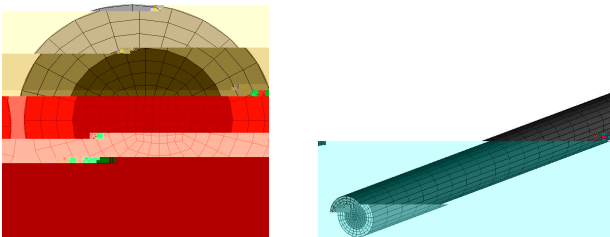
Re—— Pr——

1.2 CFD

ICEM

0.9

2



2

ANSYS FLUENT

k-ε scale

CFD

SST k-ω

1.1

1

Re>2500

Dittus—Boelter

Dittus—Boelter

		k-ε		scale			
						DB	
				Y+		W/m ² · K	
						W/m ² · K	
		mm					
1	1	5	117 000	113.541	5 096.645	5 765.28	-11.60%
2	0.8	5	126 000	90.876	4 962.348	5 765.28	-13.93%
3	0.5	5	133 000	56.969	5 002.726	5 765.28	-13.23%
4	0.3	5	135 000	34.389	5 078.075	5 765.28	-11.92%
5	1.2	5	111 000	136.188	5 101.572	5 765.28	-11.51%
6	1.5	5	110 000	170.046	5 125.708	5 765.28	-11.09%
7	2	5	108 000	226.417	5 109.092	5 765.28	-11.38%
SST k-ω							
				Y+		DB	
						W/m ² · K	
		mm					
1	0.3	5	346 000	33.7106	5 031.314	5 765.28	-12.73%
2	0.2	5	358 000	10.949	4 672.348	5 765.28	-18.96%
3	0.1	5	369 000	8.9324	4 513.348	5 765.28	-21.72%
4	0.05	5	382 000	5.320	4 319.776	5 765.28	-25.07%
5	0.04	5	432 000	1.530	4 210.186	5 765.28	-26.97%
6	0.03	5	461 000	1.320	4 103.545	5 765.28	-28.82%

1 SST $k-\omega$
Y+
 $k-\epsilon$ scale
Y+
CFD DB
15%
/
Y+
 $k-\epsilon$ scale
/
Y+

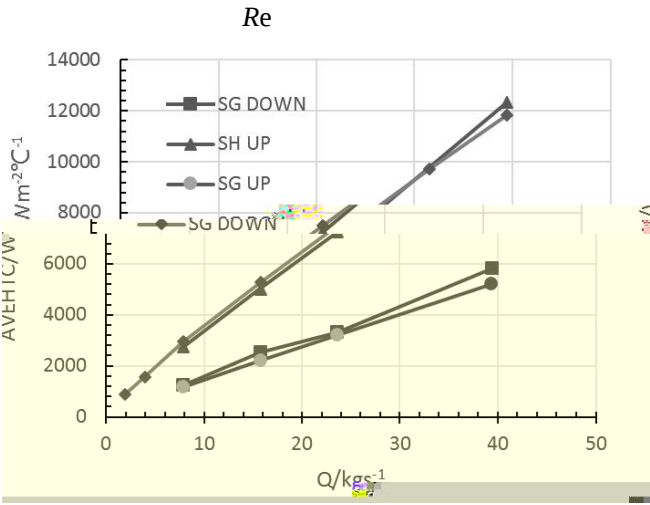
Wall_AveHFlux
W/m² Wall_AveTemp
QS_AveTemp
5 6 /

3.2

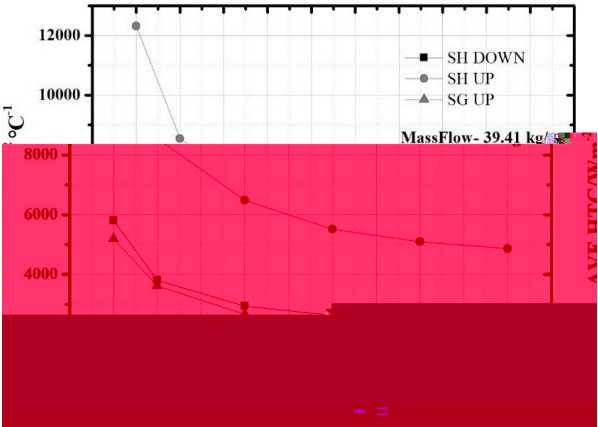
7 / 7

Re

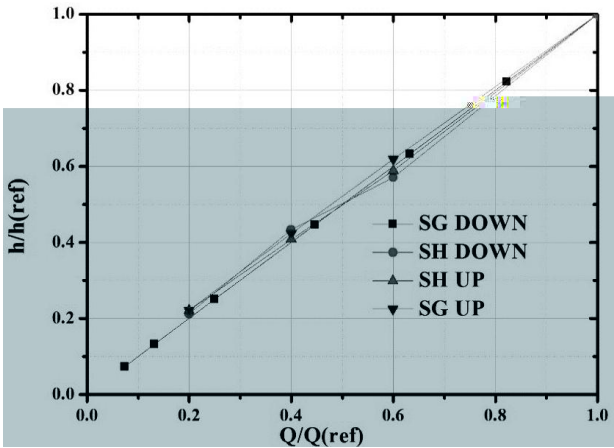
Re



7

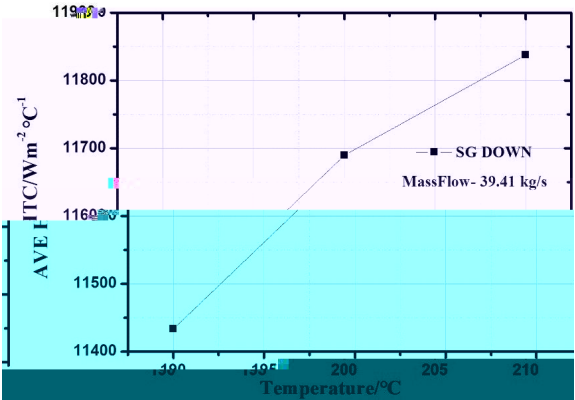


5



8

8 /



6

4 7

$$\begin{aligned} h/h(\text{ref}) &= (Q/Q(\text{ref}))^{0.9361} & 4 \\ h/h(\text{ref}) &= (Q/Q(\text{ref}))^{0.867} & 5 \\ h/h(\text{ref}) &= (Q/Q(\text{ref}))^{0.9319} & 6 \\ h/h(\text{ref}) &= (Q/Q(\text{ref}))^{0.9472} & 7 \end{aligned}$$

Q_{ref} kg/s Q
 h_{ref} W/m² h W/m²

3.3

1 3.1-3.2

2				
	2		W/	m ² .
520	2 353.31	4 863.45	2 069.26	/
480	2 500.6	5 095.85	2 155.91	/
440	2 624.16	5 512.23	2 321.8	/
400	2 936.07	6 485.71	2 673.69	/
360	3 802.03	8 545.27	3 609.1	/
340	5 814.59	12 315.19	5 194.62	/
210	/	/	/	11 837.57
200	/	/	/	11 689.51
190	/	/	/	11 433.58
	2			2

1
scalable

 $\mathbf{k}\text{-}\varepsilon$

2

3

2

4

4

7

5

3

15%

4

7

4

2

15%

[1] , . [J].

, 2004(3):472-475

[2] , , . CFD

[J]. (), 2020, 34(11):87-93

[3] , , .
[J]. , 2021, 42(1):154-160

[4] . [M]. , 2001

ANSYS FLUENT

3 14

360 MW

1

7.5 MW

7.0S MW

IEC S

10 MW

7.0S MW 10.0S MW

10 MW

2020 7

99%

2021

2021

7 MW

1.12 GW

43%

: 东 微 公众号



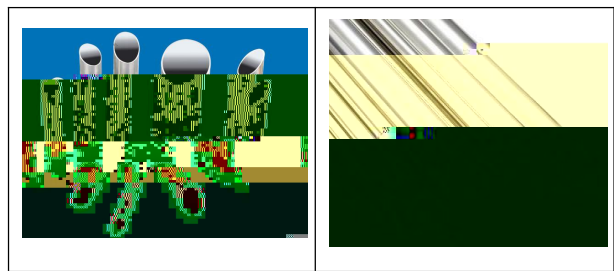
TP304 TP316

20878-2007 06Cr19Ni10(0Cr18Ni9) Cr-Ni 20 TP304 Cr Cr 12%

TP304 Cl⁻ ()

1

“TP316”(SUS316) ASTM GB/T



1

20878-2007 022Cr17Ni12Mo2 (0Cr17Ni12Mo2) Cr-Ni TP304 TP316 Mo Mo

Mo

TP304 TP316 L TP316 TP316L TP316 TP316L ≤ 0.08% GB/T TP316L ≤ 0.035% 1

											%
	C	Si	Mn	P	S	Cr	Ni	Mo			
TP304	0.04 0.10	≤ 1.00	≤ 2.0	≤ 0.04	≤ 0.03	18.0 20.0	8.0 11.0				
TP304L	≤ 0.03	≤ 1.00	≤ 2.0	≤ 0.035	≤ 0.03	18.0 20.0	8.0 11.0				
TP316	≤ 0.08	≤ 1.00	≤ 2.0	≤ 0.035	≤ 0.03	16.0 18.5	10.0 14.0	2.0 3.0			
TP316L	≤ 0.035	≤ 0.75	≤ 2.0	≤ 0.04	≤ 0.03	16.0 18.0	10.0 14.0	2.0 3.0			

2

	MPa	MPa	%	GPa	g/cm ²	W/m · K	10 ⁻⁶
TP304	≥ 515	≥ 205	≥ 35	193	8.03	13.8	15.1
TP304L	≥ 485	≥ 170	≥ 35				
TP316	≥ 515	≥ 205	≥ 35	193	8.03	13.4	16.2
TP316L	≥ 485	≥ 170	≥ 35				

3

4

mg/L		mg/L	
K ⁺			985
Na ⁺			485
Ca ²⁺	245		500
Mg ²⁺	89.5		
Fe ³⁺	13.25		610
Cl ⁻	160	pH	6.5~9.8
SO ₄ ²⁻	880		
HCO ₃ ⁻	610	COD _{Mn/Cr}	
NO ₃ ⁻		(μS/cm)	
F ⁻			100

5

2007 1		2009 9		Cl ⁻			
		5		2007 1	-2009 9	Cl ⁻ μ	
07/01/08		07/02/07		07/03/07	07/04/05	07/05/08	07/06/06 07/07/09
Cl ⁻ mg/L	13.44	13.75	16.49	7.64	9.42	11.04	8.61
07/08/07		07/09/13		07/10/10	07/11/03	07/12/05	08/01/04 08/02/15
Cl ⁻ mg/L	8.58	8.58	12.03	12.77			

()

5

TP304 TP304L TP316 TP316L

5

DLT 712-2000

09/07/02

 Cl^-

7.64mg/L

17.11mg/L

09/08/05

09/09/08

 Cl^-

07 08

TP316

TP304

TP316

TP304

100 /m²

TP316 1

100 000m²

1 000

“

20

304 316 317

”

30~40

30

AP1000

60

TP316

TP304

 Cl^-

6

6

TP316 TP304

TP316

TP 304 L	900 MW	2
	1 300 MW	2
TP 316L	440 MW	4
	632 MW	1
	965 MW	2
	900 MW	10
	1 300 MW	2
	1 400 MW	4

1 DL/T712-2000

2 316L

欢迎投稿，欢迎订阅！

EPR

EPR

TL35 TM623

A

1001-9006 2022 01-0075-03

The Introduction and Analysis of Design Process of TS EPR Nuclear Island Auxiliary Component

LI Meng

(Dongfang Electrical (Guangzhou) Heavy Machinery Co., Ltd., 511455, Guangzhou, China)

Abstract: The process of basic design and design review for TS EPR nuclear island auxiliary component is introduced. Including design input and interface design output detailed design and design review.

Key words: nuclear

“Web Order”

“Data Sheet”

“Requisition File”()

Action

Information

1.2

“Data Sheet”()

“Requisition File”()

“Data Sheet”()

“Requisition File”()

1.2.1

“Data Sheet”(

) (

3.1		AREVA
	SOFINEL	
	AREVA SOFINEL	
“Data Sheet”()	“Requisition File”()	3.5
“Specification”		3.5.1

		Requisition
	File()	
3.2		
		3.5.2

3.3		
		3.6
“Data Sheet”()	“Requisition File”()	
“Specification”		

3.4		
	AREVA SOFINEL	



“ ”

F252 F49

A

1001-9006 2022 01-0078-04

A Case Study of Optimizing Supply Chain Collaboration

(Dongfang Boiler Group Co., Ltd., 611731, Chengdu, China)

Abstract: In order to strengthen the management of the supply chain, the enterprise adopts the management idea of "horizontal integration" to break through the internal and external barriers through the systems such as product component network submission, raw materials delivery list, and drawings e-distribution to collaborators to establish an effective linkage between the enterprise and its suppliers. Thus an effective closed-loop management of the whole supply chain is constructed practically while a community of shared interests is built up systematically

Key words supply chain; product component network submission; raw materials delivery list; drawings e-distribution to collaborators



2022-01-27

1972

1994

1.2

1.1

1.3

1

2.1

2

“ ”

1

3

2

BOM

BOM

4

3

4

5

6

2.2

1

5

2016 1 1 2016 7

1

6

7

2

8

LOGO

2.3



3.1

1

1

2

2

3

3

4

4

3.2

1

2

3 SOA



“ ”



77

13

14

15



Review Sheet

3.7

Review Sheet



欢迎投稿，欢迎订阅！



PDCA

F272.35

A

1001-9006 2022 01-0082-04

Discussion about Risk Management in Nuclear

1

D

DA01

DA

1 价指数。按 出现的严 性和可 性 叠加 形成 价指数 如 3。

3

可 性等	后果影响等				
	1	2	3	4	5
5	H	H	H	S	S
4	M	H	H	S	S
3	M	M	H	H	S
2	L	M	M	H	S
1	L	L	M	M	H

注 L代 微 M代 中度 H代 度 S代 极 度 。

2 4

4

块	别	指数	接受准则	决策层次
	第 一 极 度 - 不 可 接 受	S	不可接受的极度 目执 必 免	会严 威 应报 所在公司 导层决策
	第 二 潜 在 - 点 监 控	H	潜在 会威 目执 必 专 制定 理措 施 并报知事业 导层	【 目 】 由 目 所在 导层决策
	第 三 中 等 - 不 完 全 受 控	M	不完全受控 且可 减 目 利益 受控 理 按 决定 是否专 制定 减措施 并报知 目 导层	【 目 】 审后方可接受
	第 四 低 - 完 全 受 控	L	无 审即可接受 应关注 一 无 控 措施	

3

1

2

3

4

5

1

	(+/-)	
	/	

1

2

3

5

6



3.1 PDCA

1 —P

2 —D

3 —C

/ / /

4 —A

3.2

1

5

2

3

4

5

- - - - -

a)

b)

c)

NCR-

d)

3.3



PDCA

F272

A

1001-9006 2022 01-0086-03

Research on the Prevention of Seller's Contract Risk in Financial Leasing Business

TANG Hui

(Dongfang Electric Machinery Co. Ltd. 618000 Deyang Sichuan, China)

Abstract: Financial leasing is a new transaction system with the development of economy, which is significantly different from the traditional installment sales transaction mode. In the construction of power energy point projects, especially in the procurement of power generation equipment, financial leasing becomes a common financing means. From the perspective of power generation equipment seller, this paper analyzes and discusses the contract execution risks and preventive measures faced by power generation equipment seller based on the significance of financial leasing and the role of relevant parties, hoping to provide some reference for power generation equipment manufacturing industry.

Key words: financial leasing business; seller; contract; risks and risks' preventive measures

2015 8

2015 68

[1]

“

”

[2]

2021-07-05

1980

2003

，
2.1
，

4

[1]

2.2

237

4.1

4.2

4.3

