



TEST REPORT

No. : SHIN210903146CCM

Date : Dec. 05, 2021

Page: 1 of 19

CUSTOMER NAME: TIANJIN HUAYOU SCAFFOLDING CO., LTD.
ADDRESS: ROOM331, HUAYING BUILDING, AIRPORT ECONOMIC ZONE,
TIANJIN CITY, CHINA.

Sample Name : RINGLOCK SCAFFOLDING
Product Specification : OD48.3*3.2mm
Manufacturer : TIANJIN HUAYOU SCAFFOLDING CO.,LTD.

Above information and sample(s) was/were submitted and confirmed by the client. SGS, however, assumes no responsibility to verify the accuracy, adequacy and completeness of the sample information provided by client.

Test Required : Please see the next page(s)
Test Method : Please see the next page(s)
SGS Ref. No. : TJIN2109013096ML
Date of Receipt : Sep. 25, 2021
Testing Start Date : Sep. 25, 2021
Testing End Date : Oct. 27, 2021
Test result(s) : For further details, please refer to the following page(s)
(Unless otherwise stated the results shown in this test report refer only to the sample(s) tested)

Signed for
SGS-CSTC Standards Technical
Services (Shanghai) Co., Ltd.

Joyce Li

Joyce Li
Authorized signatory



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Summary of Result(s):

No.	Test Item	Test Method	Result	Conclusion
1	Requirements for structural design-Actions	EN 12810-1:2003 clause 8.1 &EN 12811-1:2003 Clause 6.2.9	See Result	Pass
2	Deflections	EN 12810-1:2003 clause 8.7 &EN 12811-1:2003 Clause 6.3	See Result	Pass
3	Ultimate load test	Offered by client	See Result	/

Note: Pass : Meet the requirements;
Fail : Does not meet the requirements;
/ : Not Apply to the judgment.



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I. Requirements for structural design-actions

Test method:

EN 12810-1:2003 clause 8.1 & EN 12811-1:2003 Clause 6.2.9

1. Sample information

Table 1 The weight of designed bay, G_d ^{Note}

Scaffold components	Unit Mass (kg)	Number of components in design bay (38.53m design height)	The weight of design bay, G_d (kg)
1.0m Standard with spigot	5.29	148	3566
1.0m Standard without spigot	4.44	4	
1.83 Ledger	7.08	308	
0.24m Base Collar	1.43	4	
1.83×3.0m Brace	12.18	39	
0.227×1.83m Steel Plank	12.20	6	
Hollow Base Jacks	3.72	4	
U-Head(Hollow)	4.08	4	

Note: G_d =for one bay, the self-weight of the assembled scaffold at its maximum design height, including all components, such as steel plank, scaffolding standard, base collar and so on.



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Table 2 The weight of test bay, G_t Note

Scaffold components	Design unit Mass (kg)	Number of components in test bay (6.53m test height)	The weight of test bay, G_t (kg)
1.0m Standard with spigot	5.61	20	709
1.0m Standard without spigot	4.74	4	
1.83m Ledger	7.53	52	
0.24m Base Collar	1.50	4	
1.83×3.0m Brace	13.10	6	
0.227×1.83m Steel Plank	12.10	6	
Hollow Base Jacks	3.58	4	
U-Head(Hollow)	3.73	4	

Note: G_t =for one bay, the weight of the assembled scaffold as erected to the height for the test, including all the components.

Table 3 Service loads on working areas

EN 12811-1:2003 stipulates that the service uniformly distributed load applied to a working area for a load class 4 shall be 3.0kN/m².

Load class on working area	Class 4
The number of working area in design bay	One working areas
Uniformly distributed load q_1 kN/m ²	3.0

2. Scaffold configuration in test:

The maximum working area design height of scaffold system was 37.03m according to client's instruction while the scaffold assembly installed in test was one bay wide (1.83m) and one bay long (1.83m), the height of scaffold was 6m apart from adjustable leg. The maximum extension height of the adjustable leg was 450mm.



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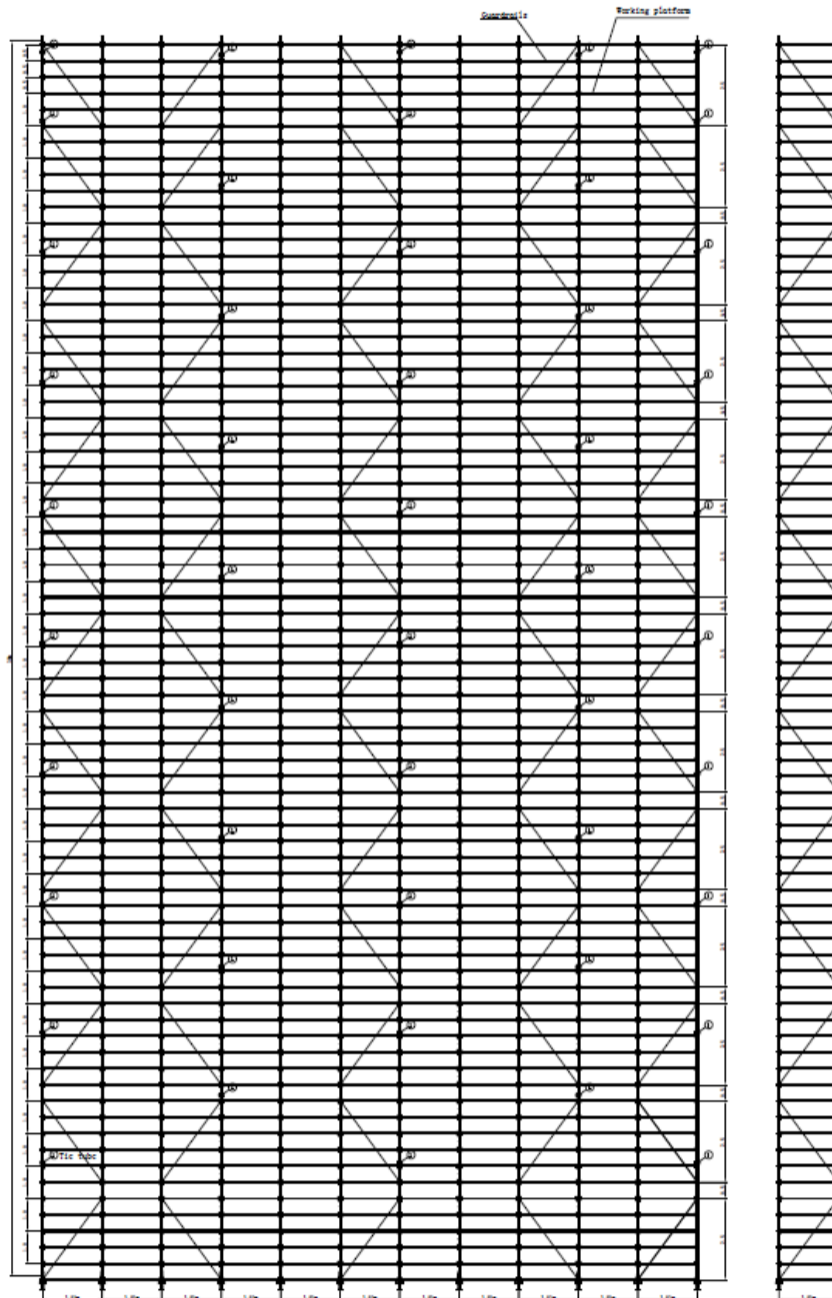
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Scaffold configuration



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3. Load calculation:

1) Self-weight of the scaffold:

A vertical load was applied simulating the action of self-weight of the scaffold assembly at the maximum design height in one bay on the standards. The load was distributed on the four standards through load beams.

$$F_v = G_d - G_t = 3566 - 709 = 2857 \text{ kgf},$$

2) Uniformly distributed service load appropriate to the class of the working scaffold specified in Table 3, column 2, acting on the working area of the most unfavourable decked level.

Specification of the steel plank: 1830mm (Length) × 227mm (Width)

Number of steel plank in three working platforms: 6pcs

$$F_u = q_1 \times L \times W = 3.0 \times 1.83 \times 0.227 \times 6 \times 1000 / 9.8 = 763 \text{ kgf}$$

3) Horizontal working load specified in 6.2.3.

Horizontal working load:

$$F_{dh1} = F_u \times 2.5\% = 186.9 \text{ N};$$

$$F_{dh2} = 300 \text{ N};$$

$F_{dh} = 300 \text{ N}$ (For each bay considered the notional horizontal load shall be not less than 2.5% of the total of the uniformly distributed load, q_1 , specified in Table 3, on that bay, or 0.3kN, which is greater.)

$$F_{th} = H_d \times F_{dh} / H_t = 37.03 \times 300 / 6.53 = 1701 \text{ N} = 173.6 \text{ kgf}$$

4. Test procedure:

Apply the load combinations to the scaffold assembly, check the scaffold whether it be capable of resisting the worst combinations of loads to which it is likely to be subjected. The horizontal load shall be applied parallel and perpendicular to the bay separately.

5. Acceptance criteria:

All system configurations shall resist the combination of loads without any visual deformation.



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6. Test results:

1) Horizontal working load parallel to the bay

Test Item	Test height	Value of Load		Test result	Conclusion
Load combinations (Service condition)	6.53m	Self-weight	2857kgf	The scaffold was capable of resisting the combination of loads without any visual deformation.	Pass
		Uniformly distributed service load	763kgf		
		Horizontal working load	173.6kgf		

2) Horizontal working load perpendicular to the bay

Test Item	Test height	Value of Load		Test result	Conclusion
Load combinations (Service condition)	6.53m	Self-weight	2857kgf	The scaffold was capable of resisting the combination of loads without any visual deformation.	Pass
		Uniformly distributed service load	763kgf		
		Horizontal working load	173.6kgf		



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Test photos:



Test assembly



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Load frame



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II. Deflection

Test method:

EN 12810-1:2003 clause 8.7 & EN 12811-1:2003 Clause 6.3

1. Side protection

Test result:

Test Item	Test location	Value of Load	Test result	Requirement	Conclusion
Deflection of the side protection	Principal guardrail	0.3 KN	1.15mm	The principal guardrail shall not have an elastic deflection greater than 35mm	Pass
	Intermediate guardrail		2.11mm	The Intermediate guardrail shall not have an elastic deflection greater than 35mm	Pass



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2. Plank

Sample Specification: 1830mm×227mm×63mm×2.00mm (Length × Width ×height× Wall thickness)

Test results:

Load class: 4

Test Item	Test span	Value of Load	Test result	Requirement	Conclusion
Concentrated load on area 500mm × 500mm	1.83m	1.50KN Note1	The platform unit was capable of supporting the concentrated load on area 500mm × 227mm and the deflection at the center of span was 3.60mm.	The platform unit shall be capable of supporting the concentrated load on area 500mm × 227mm and the deflection at the center of span shall not exceed 18.3mm.	Pass
Concentrated load on area 200mm × 200mm		1.00KN	The platform unit was capable of supporting the concentrated load on area 200mm × 200mm and the deflection at the center of span was 2.47mm.	The platform unit shall be capable of supporting the concentrated load on area 200mm × 200mm and the deflection at the center of span shall not exceed 18.3mm.	Pass

Note:

1. When a platform unit is less than 500mm wide, the load is reduced for this unit in proportion to its width, except that in no case the loading shall be reduced to less than 1.5 KN.
2. When subjected to the concentrated loads specified in table 3, columns 3 and 4 the elastic deflection of any platform unit shall not exceed 1/100 of its span.



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Table 3 — Service loads on working areas (see also 6.2.2)

Load class	Uniformly distributed load q_1 kN/m ²	Concentrated load on area 500 mm x 500 mm F_1 kN	Concentrated load on area 200 mm x 200 mm F_2 kN	Partial area load	
				q_2 kN/m ²	Partial area factor a_p ¹
1	0,75 ²	1,50	1,00	---	---
2	1,50	1,50	1,00	---	---
3	2,00	1,50	1,00	---	---
4	3,00	3,00	1,00	5,00	0,4
5	4,50	3,00	1,00	7,50	0,4
6	6,00	3,00	1,00	10,00	0,5

¹ See 6.2.2.4
² See 6.2.2.1

Sample photos:



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III. Ultimate load test

1. 1.0m Standard

Test method: Offered by client

Test procedure:

The scaffold assembly installed in test was one bay wide (1.83m) and one bay long (1.83m), by 3×1.0m standards high. Apply a compression load progressively to the top of one standard till failure occurs, record the maximum load and failure mode. See the following picture for details.



Test assembly



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Test results:

Test item	Test height	Failure load (kN)	Failure mode
Ultimate load test of 1.0m standard	3.0m	217.33	The sample was bending in the first standard

Test photos:



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After test



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2. 1.83m Ledger

Test method: Offered by client

Test procedure:

Fix the sample on the platform of universal testing machine as per client's requirement, apply a compression load progressively to the middle of ledger via a 100 × 100mm block till failure occurs, record the maximum load and failure mode. See the following picture for details.



Test assembly

Test results:

Test item	Failure load (kN)	Failure mode
Ultimate load test of 1.83m ledger	14.04	The sample was bending in the middle of ledger



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Test photos:



1.83m Ledger



After test



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3. Steel plank

Sample Specification: 1830mm×227mm×63mm×2.00mm (Length × Width ×height× Wall thickness)

Test method: Offered by client

Test procedure:

Fix the sample on the platform of universal testing machine as per client's requirement, apply a compression load progressively to the middle of ledger via a 200mm×200mm block till failure occurs, record the maximum load and failure mode. See the following picture for details.



Test assembly

Test results:

Test item	Failure load (kN)	Failure mode
Ultimate load test of steel plank	9.16	The sample was bending in the middle of plank



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Test photos:



Plank



After test

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