

Sample Name : A335-P91 Sch.160
 Sample Number : B-1, B-2, B-3, B-4
 Material & Specification : -
 Date of Receipt : 2016.06.21
 Date of Test : 2016.06.27 - 2016.06.28
 Test Method Used : Refer to test results
 Client Name : Daewoo Engineering & Construction Co., Ltd.
 Client Address : 75, Saemunan-ro, Jongno-gu, Seoul, Korea

Test Results

1. Chemical composition

Test item	Unit	Results (B-4)	Test method
C	%	0.19	ASTM A751-14a
Mn	%	0.85	
Si ✓	%	0.24	
P ✓	%	0.008	
S ✓	%	0.004	
Ni	%	0.078	
Cr ✗	%	0.052	
Mo ✗	%	0.024	
V ✗	%	0.003	
Ti ✓	%	0.001	
Al	%	0.009	
Nb	%	0.001	
Zr	%	0.000 5	
N	%	0.009	

* Analyzed by optical emission spectrometer and ONH836(LECO).

2. Vickers hardness [Test method: ASTM E384-11^{e1}]

Test specimen	Results		
	Point 1	Point 2	Point 3
B-1	119 HV 10	121 HV 10	120 HV 10
B-2	119 HV 10	121 HV 10	119 HV 10
B-3	117 HV 10	118 HV 10	121 HV 10

- To be continued -

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report can be checked through the <http://e-checking.kr.sgs.com>.

Tested by / Wooyoung Seok

Approved by Technical Manager / Changsu Jeong

June 28, 2016

SGS Korea Co., Ltd. Material Laboratory

Tel. (051) 630-7001 Fax. (051) 630-7096

This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

