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**TEST REPORT
CHARACTERISTIC EVALUATION OF UAB PROLIGNO TIMBER I-JOISTS**

CLIENT:

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REGISTRATION ID: 303350553
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JOB NUMBER: UAB/19/001

*This Test Report refers to testing only one sample
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REPORT NUMBER: 19/065

*Prepared by:
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Contents

1. Introduction.....	4
2. Executive test results.....	4
3. Testing Details & Methodology:.....	5
3.1. Determination of Characteristic Shear Capacity	5
3.2. Determination of Characteristic Bending Capacity.....	5
3.3. Determination of End reaction bearing Capacity	5
3.4. Determination of Intermediate bearing Capacity	5
4. Test Specimens & Sampling:.....	5
5. TEST RESULTS.....	6
5.1. Bending test results	6
5.2. Shear test results	8
5.3. End bearing test results.....	8
5.4. End bearing test results.....	17
Table 1 Executive summary of test results.....	4
Table 2 Test specimen details.....	5
Table 3 Individual bending test results.....	6
Table 4 Bending statistical analysis for 90mm flange width	7
Table 5 Bending statistical analysis for 75mm flange width	7
Table 6 Bending statistical analysis for 51mm flange width	7
Table 7 Bending statistical analysis for 40mm flange width	8
Table 8 Individual shear test results for a flange width of 40mm	8
Table 9 Characteristic shear capacity for a flange width of 40mm with statistical parameters	8
Table 10 Individual 30mm end bearing results for a flange width of 40mm	9
Table 11 Characteristic 30mm end bearing capacity for a flange width of 40mm with statistical parameters	9
Table 12 Individual 30mm end bearing results for a flange width of 51mm	10
Table 13 Characteristic 30mm end bearing capacity for a flange width of 51mm with statistical parameters	10
Table 14 Individual 30mm end bearing results for a flange width of 75mm	11
Table 15 Characteristic 30mm end bearing capacity for a flange width of 75mm with statistical parameters	11
Table 16 Individual 30mm end bearing results for a flange width of 90mm	12
Table 17 Characteristic 30mm end bearing capacity for a flange width of 90mm with statistical parameters	12
Table 18 Individual 90mm end bearing results for a flange width of 40mm	13
Table 19 Characteristic 90mm end bearing capacity for a flange width of 40mm with statistical parameters	13
Table 20 Individual 90mm end bearing results for a flange width of 51mm	14
Table 21 Characteristic 90mm end bearing capacity for a flange width of 51mm with statistical parameters	14

Table 22	Individual 90mm end bearing results for a flange width of 75mm	15
Table 23	Characteristic 90mm end bearing capacity for a flange width of 75mm with statistical parameters	15
Table 24	Individual 90mm end bearing results for a flange width of 90mm	16
Table 25	Characteristic 90mm end bearing capacity for a flange width of 90mm with statistical parameters	16
Table 26	Individual 45mm intermediate bearing results for a flange width of 40mm	17
Table 27	Characteristic 45mm intermediate bearing capacity for a flange width of 40mm with statistical parameters	17
Table 28	Individual 45mm intermediate bearing results for a flange width of 51mm	18
Table 29	Characteristic 45mm intermediate bearing capacity for a flange width of 51mm with statistical parameters	18
Table 30	Individual 45mm intermediate bearing results for a flange width of 75mm	19
Table 31	Characteristic 45mm intermediate bearing capacity for a flange width of 75mm with statistical parameters	19
Table 32	Individual 45mm intermediate bearing results for a flange width of 90mm	20
Table 33	Characteristic 45mm intermediate bearing capacity for a flange width of 90mm with statistical parameters	20
Table 34	Individual 90mm intermediate bearing results for a flange width of 40mm	21
Table 35	Characteristic 90mm intermediate bearing capacity for a flange width of 40mm with statistical parameters	21
Table 36	Individual 90mm intermediate bearing results for a flange width of 51mm	22
Table 37	Characteristic 90mm intermediate bearing capacity for a flange width of 51mm with statistical parameters	22
Table 38	Individual 90mm intermediate bearing results for a flange width of 75mm	23
Table 39	Characteristic 90mm intermediate bearing capacity for a flange width of 75mm with statistical parameters	23
Table 40	Individual 90mm intermediate bearing results for a flange width of 90mm	24
Table 41	Characteristic 90mm intermediate bearing capacity for a flange width of 90mm with statistical parameters	24

1. Introduction

Evaluation of characteristic properties of UAB I-joist in accordance with the testing methodologies described in ISO 22389-1, the test data was analysed in accordance with ISO 22389-1 and AS/NZS4063.

2. Executive test results

Table 1 Executive summary of test results

Depth (mm)	Flange width (mm)	Resistive Moment M x10 ³ (kNmm)	Bending Rigidity EI x10 ⁹ (Nmm ²)		Vertical Shear (kN)	End Bearing(kN)		Intermediate Bearing (kN)	
			True	Apparent		30 (mm)	90 (mm)	45 (mm)	90 (mm)
300	40	11.27	883.18E+6	808E+6	17.0	14.9	15.8	18.0	20.8
300	51	14.79	1,103.72E+6	988E+6	-	17.1	15.0	20.4	23.3
300	75	19.48	1,599.81E+6	1,367E+6	-	19.1	17.8	29.8	34.8
300	90	23.33	1,746.70E+6	1,476E+6	-	19.6	18.0	32.0	34.0

3. Testing Details & Methodology:

Only one depth was considered in these tests (300mm), but several flange width values were considered, as follows:

3.1. Determination of Characteristic Shear Capacity

In accordance with Clause 5.2.2 of ISO-22389-1, a single flange of 40mm was tested:

3.2. Determination of Characteristic Bending Capacity

In accordance with Clause 5.4.2 of ISO-22389-1, one depth and four flange width sizes of 40, 51, 75 and 90mm were tested. The sample size for each flange width was 10 in lieu of 28 as specified in ISO 22389-1, (Cl. 5.4.3.1).

3.3. Determination of End reaction bearing Capacity

In accordance with Clause 5.3.2.1 of ISO-22389-1, one depth and four flange width sizes of 40, 51, 75 and 90mm were tested. UAB specified an end reaction width of 30 and 90mm:

3.4. Determination of Intermediate bearing Capacity

In accordance with Clause 5.3.2.2 of ISO-22389-1, one depth and four flange width sizes of 40, 51, 75 and 90mm were tested. UAB specified an intermediate bearing width of 45 and 90mm:

4. Test Specimens & Sampling:

All specimens were dispatched to the Universal Testing Facility Laboratory for testing, Some specimens had web joints.

The testing authority was not involved in the manufacturing or sampling process. Therefore, the test results in this report represent the specimens tested only.

Table 2 Test specimen details

All specimens tested were of a nominal depth of 300mm.

Test type	Bearing width (mm)	Flange width (mm)	Sample size
Bending	N/A	40	10
		51	10
		75	10
		90	10
Shear	N/A	40	30
End bearing	30	40	30
		51	30
		75	30
		90	30
	90	40	30
		51	30
		75	30
		90	30
Intermediate bearing	45	40	30
		51	30
		75	30
		90	30
Intermediate bearing	90	40	30
		51	30
		75	30
		90	30

5. TEST RESULTS

5.1. Bending test results

5.1.1. Individual test data

Table 3 Individual bending test results

Specimen ID	EI_{true} kN.mm ²	$EI_{apparent}$ kN.mm ²	Resistive Moment kN.mm
90-1	1,671.67E+6	1,421.90E+6	30003
90-2	1,716.10E+6	1,453.92E+6	29026
90-3	1,737.79E+6	1,469.46E+6	37171
90-4	1,735.81E+6	1,468.05E+6	37968
90-5	1,683.40E+6	1,430.38E+6	28798
90-6	1,804.02E+6	1,516.54E+6	36492
90-7	1,766.17E+6	1,489.70E+6	37975
90-8	1,777.11E+6	1,497.47E+6	26265
90-9	1,908.92E+6	1,589.99E+6	29532
90-10	1,818.70E+6	1,526.90E+6	34593
75-1	1,580.34E+6	1,355.28E+6	26763
75-2	1,537.61E+6	1,323.74E+6	29565
75-3	1,593.80E+6	1,365.17E+6	21474
75-4	1,684.70E+6	1,431.32E+6	24611
75-5	1,644.08E+6	1,401.89E+6	29505
75-6	1,599.26E+6	1,369.17E+6	25934
75-7	1,630.18E+6	1,369.17E+6	27797
75-8	1,539.20E+6	1,324.91E+6	24944
75-9	1,625.34E+6	1,388.24E+6	29434
75-10	1,675.25E+6	1,424.49E+6	33636
51-1	1,173.91E+6	1,045.01E+6	23759
51-2	1,181.04E+6	1,050.66E+6	21444
51-3	1,189.38E+6	1,057.25E+6	22879
51-4	993.42E+6	899.52E+6	18561
51-5	930.06E+6	847.26E+6	15963
51-6	1,178.96E+6	1,049.01E+6	23503
51-7	1,136.61E+6	1,015.34E+6	21325
51-8	1,188.78E+6	1,056.78E+6	20852
51-9	1,151.97E+6	1,027.58E+6	20896
51-10	1,119.23E+6	1,001.45E+6	21313
40-1	880.09E+6	805.59E+6	11910
40-2	849.83E+6	780.16E+6	16502
40-3	861.86E+6	790.29E+6	17111
40-4	975.36E+6	884.69E+6	16968
40-5	892.18E+6	815.71E+6	16252
40-6	849.27E+6	779.69E+6	16539
40-7	882.62E+6	807.71E+6	16381
40-8	889.09E+6	813.12E+6	16621
40-9	946.54E+6	860.91E+6	17112
40-10	891.90E+6	815.48E+6	15853

EI_{true} is the bending stiffness rigidity with shear deflections considered, and it was calculated using equation 1.

$$EI_{true} = \frac{Pa(3L^2 - 4a^2)}{\Delta \left[48 \left(1 - \frac{4Pa}{\Delta K} \right) \right]} \quad (1)$$

$EI_{apparent}$ is the bending stiffness rigidity without considering the shear deflections in the computations, and it was calculated using equation 2.

$$EI_{\text{apparent}} = \left(\frac{P}{\Delta}\right) \frac{23L^3}{1296} \tag{2}$$

Where

- a = $L/3$
- L Test span
- P/Δ Slope of load deflection at the linear part of the curve.
- K Shear coefficient which was extracted from a paper for APA, <https://www.apawood.org/Data/Sites/1/documents/technicalresearch/paper-1999-ptec-pri-400-i-joists.pdf>

Note that the shear factor was derived for I-Joists with specific flange and web properties as per the paper, it is unknown if this factor is applicable to the I-joisted tested.

5.1.2. Statistical analysis for bending stiffness rigidity and resistive moment based on AS/NZS4063

Table 4 Bending statistical analysis for 90mm flange width

n	10	n	10	n	10
\bar{y}	21.28899262	\bar{y}	21.11914378	f	32782.3
S	0.039455376	S	0.03323287	S	4483.2
V_E	3.9%	V_E	3.3%	V_R	13.7%
E_{05}	1650078206	E_{05}	1406648431	f_{05}	26265.0
\bar{E}	1762097995	\bar{E}	1486508614	k_s	0.92
k_s	0.99126278	k_s	0.992641559	a_v	96.3%
$E_{k,mean1}$	1746702157	$E_{k,mean1}$	1475570228	M	23330
$E_{k,mean2}$	2336658728	$E_{k,mean2}$	1994710989		
EI_{true}	1,746.70E+6	EI_{apparent}	1,475.57E+6		

Table 5 Bending statistical analysis for 75mm flange width

n	10	n	10	n	10
\bar{y}	21.1996598	\bar{y}	21.04164372	f	27366.3
S	0.031535706	S	0.026761953	S	3395.6
V_E	3.2%	V_E	2.7%	V_R	12.4%
E_{05}	1528852917	E_{05}	1315681085	f_{05}	21474.4
\bar{E}	1611058173	\bar{E}	1375388147	k_s	0.93
k_s	0.993017538	k_s	0.994074928	a_v	97.6%
$E_{k,mean1}$	1599809020	$E_{k,mean1}$	1367238874	M	19477
$E_{k,mean2}$	2168825371	$E_{k,mean2}$	1868407971		
EI_{true}	1,599.81E+6	EI_{apparent}	1,367.24E+6		

Table 6 Bending statistical analysis for 51mm flange width

n	10	n	10	n	10
\bar{y}	20.83734555	\bar{y}	20.7257074	f	21049.4
S	0.084817767	S	0.076317498	S	2336.6
V_E	8.5%	V_E	7.6%	V_R	11.1%
E_{05}	974875499	E_{05}	884174604	f_{05}	15963.0
\bar{E}	1124880428	\bar{E}	1005368101	k_s	0.94
k_s	0.981190969	k_s	0.983081773	a_v	98.9%
$E_{k,mean1}$	1103722517	$E_{k,mean1}$	988359056	M	14790
$E_{k,mean2}$	1366484336	$E_{k,mean2}$	1241737054		
EI_{true}	1,103.72E+6	EI_{apparent}	988.36E+6		

Table 7 Bending statistical analysis for 40mm flange width

<i>n</i>	10	<i>n</i>	10	<i>n</i>	10
\bar{y}	20.60793756	\bar{y}	20.51836195	<i>f</i>	16124.8
<i>S</i>	0.044387482	<i>S</i>	0.04051602	<i>S</i>	1532.5
<i>V_E</i>	4.4%	<i>V_E</i>	4.1%	<i>V_R</i>	9.5%
<i>E₀₅</i>	828328314	<i>E₀₅</i>	762195083	<i>f₀₅</i>	11910.2
\bar{E}	891951825	\bar{E}	815394597	<i>k_s</i>	0.95
<i>k_s</i>	0.99016957	<i>k_s</i>	0.991027715	<i>a_v</i>	100.0%
<i>E_{k,mean1}</i>	883183555	<i>E_{k,mean1}</i>	808078644	<i>M</i>	11266
<i>E_{k,mean2}</i>	1171693558	<i>E_{k,mean2}</i>	1079080644		
<i>EI_{true}</i>	883.18E+6	<i>EI_{apparent}</i>	808.08E+6		

5.2. Shear test results

5.2.1. Individual test data

Table 8 Individual shear test results for a flange width of 40mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	40.342	20.2	16	44.840	22.4
2	40.942	20.5	17	39.734	19.9
3	37.020	18.5	18	39.484	19.7
4	31.154	15.6	19	38.140	19.1
5	41.526	20.8	20	41.388	20.7
6	37.000	18.5	21	39.722	19.9
7	43.586	21.8	22	39.580	19.8
8	37.648	18.8	23	37.210	18.6
9	38.914	19.5	24	39.030	19.5
10	42.924	21.5	25	42.102	21.1
11	39.774	19.9	26	38.812	19.4
12	37.494	18.7	27	37.050	18.5
13	40.684	20.3	28	39.856	19.9
14	36.640	18.3	29	41.724	20.9
15	33.878	16.9	30	41.554	20.8

Shear strength was calculated as half of the ultimate shear failure load in kN.

5.2.2. Statistical analysis and the characteristic shear strength capacity P_s computed in accordance with equation 5 of ISO 22389-1, Cl 5.2.12.2.

$$P_s = \bar{P}_l - K \times C_{V,i} \times \bar{P}_l$$

Where K is the factor for 5th percentile with 75 % confidence for a normal distribution in accordance with ASTM D2915, $C_{V,i}$ is the Coefficient of Variation, and \bar{P}_l is the mean shear strength.

Table 9 Characteristic shear capacity for a flange width of 40mm with statistical parameters

<i>n</i>	30
\bar{P}_l	19.7
<i>S</i>	1.4
<i>C_V</i>	7.1%
<i>K</i>	1.869
P_s	17.0

5.3. End bearing test results

5.3.1. End bearing of 30mm width

5.3.1.1. 30mm End bearing for 40mm flange width.

Table 10 Individual 30mm end bearing results for a flange width of 40mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	40.342	20.2	16	44.840	22.4
2	40.942	20.5	17	39.734	19.9
3	37.020	18.5	18	39.484	19.7
4	31.154	15.6	19	38.140	19.1
5	41.526	20.8	20	41.388	20.7
6	37.000	18.5	21	39.722	19.9
7	43.586	21.8	22	39.580	19.8
8	37.648	18.8	23	37.210	18.6
9	38.914	19.5	24	39.030	19.5
10	42.924	21.5	25	42.102	21.1
11	39.774	19.9	26	38.812	19.4
12	37.494	18.7	27	37.050	18.5
13	40.684	20.3	28	9.856	4.9
14	36.640	18.3	29	41.724	21
15	33.878	16.9	30	41.554	21

Bearing strength was calculated as half of the ultimate failure load in kN.

5.3.1.2. Characteristic capacity for 30mm End bearing of 40mm flange width.

Table 11 Characteristic 30mm end bearing capacity for a flange width of 40mm with statistical parameters

n	30
\bar{P}_t	19.2
S	3.0
C_V	15.8%
K	1.869
$P_{EB30,40}$	14.9

Note that the same methodology for calculating shear is implemented as per Section 5.2.2. $P_{EB30,40}$ is used to designate the 30mm end bearing for a 40mm flange width.

5.3.1.3. 30mm End bearing for 51mm flange width.

Table 12 Individual 30mm end bearing results for a flange width of 51mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	47.199	23.6	16	45.920	23.0
2	42.848	21.4	17	39.660	19.8
3	44.246	22.1	18	33.056	16.5
4	43.682	21.8	19	41.046	20.5
5	42.856	21.4	20	41.380	20.7
6	45.820	22.9	21	48.874	24.4
7	51.906	26.0	22	46.992	23.5
8	48.526	24.3	23	45.194	22.6
9	44.154	22.1	24	45.510	22.8
10	52.734	26.4	25	45.446	22.7
11	47.248	23.6	26	44.018	22.0
12	46.254	23.1	27	36.706	18.4
13	42.132	21.1	28	45.956	23.0
14	31.310	15.7	29	46.476	23.2
15	39.658	19.8	30	41.254	20.6

Bearing strength was calculated as half of the ultimate failure load in kN.

5.3.1.4. Characteristic capacity for 30mm End bearing of 51mm flange width.

Table 13 Characteristic 30mm end bearing capacity for a flange width of 51mm with statistical parameters

n	30
\bar{P}_t	22.0
S	2.4
C_V	10.7%
K	1.869
$P_{EB30,51}$	17.1

Note that the same methodology for calculating shear is implemented as per Section 5.2.2. $P_{EB30,51}$ is used to designate the 30mm end bearing for a 51mm flange width.

5.3.1.5. 30mm End bearing for 75mm flange width.

Table 14 Individual 30mm end bearing results for a flange width of 75mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	50.446	25.2	16	50.404	25.2
2	52.786	26.4	17	50.924	25.5
3	48.874	24.4	18	50.004	25.0
4	50.600	25.3	19	49.464	24.7
5	42.808	21.4	20	42.866	21.4
6	43.184	21.6	21	50.532	25.3
7	51.200	25.6	22	51.134	25.6
8	34.644	17.3	23	48.558	24.3
9	48.890	24.4	24	50.884	25.4
10	50.388	25.2	25	50.916	25.5
11	56.596	28.3	26	48.606	24.3
12	51.138	25.6	27	48.260	24.1
13	50.148	25.1	28	51.844	25.9
14	50.096	25.0	29	45.042	22.5
15	52.076	26.0	30	51.310	25.7

Bearing strength was calculated as half of the ultimate failure load in kN.

5.3.1.6. Characteristic capacity for 30mm End bearing of 75mm flange width.

Table 15 Characteristic 30mm end bearing capacity for a flange width of 75mm with statistical parameters

n	30
\bar{P}_t	24.6
S	2.0
C_V	8.2%
K	1.869
$P_{EB30,75}$	19.1

Note that the same methodology for calculating is shear implemented as per Section 5.2.2. $P_{EB30,75}$ is used to designate the 30mm end bearing for a 75mm flange width.

5.3.1.7. 30mm End bearing for 90mm flange width.

Table 16 Individual 30mm end bearing results for a flange width of 90mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	49.600	24.8	16	47.450	23.7
2	58.540	29.3	17	48.172	24.1
3	49.778	24.9	18	57.308	28.7
4	53.810	26.9	19	41.030	20.5
5	48.162	24.1	20	45.238	22.6
6	49.238	24.6	21	56.578	28.3
7	52.302	26.2	22	44.798	22.4
8	48.062	24.0	23	42.716	21.4
9	49.776	24.9	24	60.982	30.5
10	52.480	26.2	25	49.258	24.6
11	49.384	24.7	26	47.932	24.0
12	54.528	27.3	27	49.696	24.8
13	50.450	25.2	28	48.752	24.4
14	49.806	24.9	29	47.038	23.5
15	52.992	26.5	30	55.200	27.6

Bearing strength was calculated as half of the ultimate failure load in kN.

5.3.1.8. Characteristic capacity for 30mm End bearing of 90mm flange width.

Table 17 Characteristic 30mm end bearing capacity for a flange width of 90mm with statistical parameters

n	30
\bar{P}_t	25.2
S	2.2
C_V	8.9%
K	1.869
$P_{EB30,90}$	19.6

Note that the same methodology for calculating shear is implemented as per Section 5.2.2. $P_{EB30,90}$ is used to designate the 30mm end bearing for a 90mm flange width.

5.3.2. End bearing of 90mm width

5.3.2.1. 90mm End bearing for 40mm flange width.

Table 18 Individual 90mm end bearing results for a flange width of 40mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	41.356	20.7	16	49.621	24.8
2	40.932	20.5	17	43.468	21.7
3	46.191	23.1	18	38.210	19.1
4	43.620	21.8	19	42.052	21.0
5	43.408	21.7	20	46.506	23.3
6	42.914	21.5	21	42.972	21.5
7	43.526	21.8	22	41.772	20.9
8	44.744	22.4	23	43.928	22.0
9	41.330	20.7	24	45.324	22.7
10	45.106	22.6	25	44.156	22.1
11	41.362	20.7	26	46.584	23.3
12	42.484	21.2	27	44.640	22.3
13	47.080	23.5	28	42.780	21.4
14	41.474	20.7	29	39.616	20
15	43.954	22.0	30	42.956	21

Bearing strength was calculated as half of the ultimate failure load in kN.

5.3.2.2. Characteristic capacity for 90mm End bearing of 40mm flange width.

Table 19 Characteristic 90mm end bearing capacity for a flange width of 40mm with statistical parameters

n	30
\bar{P}_t	21.7
S	1.2
C_V	5.4%
K	1.869
$P_{EB90,40}$	15.8

Note that the same methodology for calculating shear is implemented as per Section 5.2.2. $P_{EB90,40}$ is used to designate the 90mm end bearing for a 40mm flange width.

5.3.2.3. 90mm End bearing for 51mm flange width.

Table 20 Individual 90mm end bearing results for a flange width of 51mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	34.790	17.4	16	44.102	22.1
2	31.146	15.6	17	41.080	20.5
3	47.170	23.6	18	27.206	13.6
4	41.250	20.6	19	54.282	27.1
5	27.070	13.5	20	51.732	25.9
6	26.922	13.5	21	47.268	23.6
7	48.560	24.3	22	44.766	22.4
8	52.732	26.4	23	26.900	13.5
9	32.152	16.1	24	30.422	15.2
10	37.684	18.8	25	47.814	23.9
11	41.390	20.7	26	47.094	23.5
12	50.256	25.1	27	45.076	22.5
13	26.834	13.4	28	41.570	20.8
14	48.200	24.1	29	50.974	25.5
15	47.106	23.6	30	48.324	24.2

Bearing strength was calculated as half of the ultimate failure load in kN.

5.3.2.4. Characteristic capacity for 90mm End bearing of 51mm flange width.

Table 21 Characteristic 90mm end bearing capacity for a flange width of 51mm with statistical parameters

n	30
\bar{P}_t	20.7
S	4.5
C_V	21.7%
K	1.869
$P_{EB90,51}$	15.0

Note that the same methodology for calculating shear is implemented as per Section 5.2.2. $P_{EB90,51}$ is used to designate the 90mm end bearing for a 51mm flange width.

5.3.2.5. 90mm End bearing for 75mm flange width.

Table 22 Individual 90mm end bearing results for a flange width of 75mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	50.480	25.2	16	50.616	25.3
2	31.625	15.8	17	53.884	26.9
3	52.472	26.2	18	42.872	21.4
4	45.866	22.9	19	53.938	27.0
5	47.102	23.6	20	54.148	27.1
6	52.854	26.4	21	50.654	25.3
7	42.684	21.3	22	45.566	22.8
8	53.294	26.6	23	52.868	26.4
9	49.804	24.9	24	47.872	23.9
10	57.130	28.6	25	41.576	20.8
11	47.348	23.7	26	42.802	21.4
12	53.836	26.9	27	56.802	28.4
13	55.366	27.7	28	50.346	25.2
14	52.632	26.3	29	41.584	20.8
15	41.712	20.9	30	51.774	25.9

Bearing strength was calculated as half of the ultimate failure load in kN.

5.3.2.6. Characteristic capacity for 90mm End bearing of 51mm flange width.

Table 23 Characteristic 90mm end bearing capacity for a flange width of 75mm with statistical parameters

n	30
\bar{P}_t	24.5
S	2.9
C_V	11.8%
K	1.869
$P_{EB90,75}$	17.8

Note that the same methodology for calculating shear is implemented as per Section 5.2.2. $P_{EB90,75}$ is used to designate the 90mm end bearing for a 75mm flange width.

5.3.2.7. 90mm End bearing for 90mm flange width.

Table 24 Individual 90mm end bearing results for a flange width of 90mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	49.686	24.8	16	43.502	21.8
2	55.608	27.8	17	50.470	25.2
3	54.398	27.2	18	39.368	19.7
4	51.428	25.7	19	56.136	28.1
5	51.158	25.6	20	36.436	18.2
6	56.120	28.1	21	56.298	28.1
7	42.044	21.0	22	49.044	24.5
8	45.806	22.9	23	45.700	22.9
9	49.570	24.8	24	53.382	26.7
10	42.212	21.1	25	49.190	24.6
11	42.600	21.3	26	49.014	24.5
12	52.858	26.4	27	54.330	27.2
13	49.048	24.5	28	43.962	22.0
14	57.612	28.8	29	51.080	25.5
15	57.736	28.9	30	51.026	25.5

Bearing strength was calculated as half of the ultimate failure load in kN.

5.3.2.8. Characteristic capacity for 90mm End bearing of 90mm flange width.

Table 25 Characteristic 90mm end bearing capacity for a flange width of 90mm with statistical parameters

n	30
\bar{P}_t	24.8
S	2.8
C_V	11.3%
K	1.869
$P_{EB90,90}$	18.0

Note that the same methodology for calculating shear is implemented as per Section 5.2.2. $P_{EB90,90}$ is used to designate the 90mm end bearing for a 90mm flange width.

5.4. End bearing test results

5.4.1. Intermediate bearing of 45mm width

5.4.1.1. 45mm End bearing for 40mm flange width.

Table 26 Individual 45mm intermediate bearing results for a flange width of 40mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	22.288	22.3	16	22.838	22.8
2	15.466	15.5	17	24.352	24.4
3	21.020	21.0	18	19.868	19.9
4	20.766	20.8	19	22.276	22.3
5	21.940	21.9	20	24.768	24.8
6	19.550	19.6	21	21.514	21.5
7	23.868	23.9	22	21.028	21.0
8	23.566	23.6	23	19.114	19.1
9	21.426	21.4	24	22.284	22.3
10	20.606	20.6	25	24.176	24.2
11	22.606	22.6	26	23.680	23.7
12	21.340	21.3	27	21.834	21.8
13	20.398	20.4	28	21.054	21.1
14	22.282	22.3	29	21.594	21.6
15	20.114	20.1	30	23.582	23.6

Bearing strength was calculated as half of the ultimate failure load in kN.

5.4.1.2. Characteristic capacity for 45mm Intermediate bearing of 40mm flange width.

Table 27 Characteristic 45mm intermediate bearing capacity for a flange width of 40mm with statistical parameters

n	30
\bar{P}_l	21.7
S	1.9
C_V	8.7%
K	1.869
$P_{IB45,40}$	18.0

Note that the same methodology for calculating shear is implemented as per Section 5.2.2. $P_{IB45,40}$ is used to designate the 45mm intermediate bearing for a 40mm flange width.

5.4.1.3. 45mm Intermediate bearing for 51mm flange width.

Table 28 Individual 45mm intermediate bearing results for a flange width of 51mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	24.564	24.6	16	27.804	27.8
2	24.302	24.3	17	24.254	24.3
3	26.302	26.3	18	26.968	27.0
4	24.524	24.5	19	25.336	25.3
5	25.948	25.9	20	25.814	25.8
6	26.016	26.0	21	25.176	25.2
7	23.174	23.2	22	26.288	26.3
8	25.496	25.5	23	24.262	24.3
9	24.714	24.7	24	24.120	24.1
10	21.982	22.0	25	22.062	22.1
11	23.608	23.6	26	25.252	25.3
12	22.852	22.9	27	26.338	26.3
13	24.512	24.5	28	23.682	23.7
14	20.878	20.9	29	22.496	22.5
15	27.532	27.5	30	24.414	24.4

Bearing strength was calculated as half of the ultimate failure load in kN.

5.4.1.4. Characteristic capacity for 45mm Intermediate bearing of 51mm flange width.

Table 29 Characteristic 45mm intermediate bearing capacity for a flange width of 51mm with statistical parameters

n	30
\bar{P}_l	24.7
S	1.7
C_V	6.7%
K	1.869
$P_{IB45,51}$	20.4

Note that the same methodology for calculating shear is implemented as per Section 5.2.2. $P_{IB45,51}$ is used to designate the 45mm intermediate bearing for a 51mm flange width.

5.4.1.5. 45mm Intermediate bearing for 75mm flange width.

Table 30 Individual 45mm intermediate bearing results for a flange width of 75mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	38.212	38.2	16	36.476	36.5
2	35.578	35.6	17	39.466	39.5
3	41.966	42.0	18	37.664	37.7
4	33.748	33.7	19	31.778	31.8
5	38.868	38.9	20	38.950	39.0
6	33.160	33.2	21	28.744	28.7
7	33.674	33.7	22	34.880	34.9
8	34.886	34.9	23	29.426	29.4
9	39.254	39.3	24	34.024	34.0
10	34.588	34.6	25	35.708	35.7
11	39.870	39.9	26	37.032	37.0
12	38.050	38.1	27	36.504	36.5
13	37.372	37.4	28	30.860	30.9
14	35.958	36.0	29	37.208	37.2
15	42.116	42.1	30	32.234	32.2

Bearing strength was calculated as half of the ultimate failure load in kN.

5.4.1.6. Characteristic capacity for 45mm Intermediate bearing of 75mm flange width.

Table 31 Characteristic 45mm intermediate bearing capacity for a flange width of 75mm with statistical parameters

n	30
\bar{P}_l	35.9
S	3.4
C_V	9.3%
K	1.869
$P_{IB45,75}$	29.8

Note that the same methodology for calculating shear is implemented as per Section 5.2.2. $P_{IB45,75}$ is used to designate the 45mm intermediate bearing for a 75mm flange width.

5.4.1.7. 45mm Intermediate bearing for 90mm flange width.

Table 32 Individual 45mm intermediate bearing results for a flange width of 90mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	37.754	37.8	16	39.334	39.3
2	40.248	40.2	17	41.092	41.1
3	38.722	38.7	18	38.378	38.4
4	45.172	45.2	19	38.352	38.4
5	46.780	46.8	20	37.418	37.4
6	38.832	38.8	21	37.622	37.6
7	37.778	37.8	22	31.156	31.2
8	39.822	39.8	23	27.328	27.3
9	38.076	38.1	24	41.020	41.0
10	42.604	42.6	25	38.314	38.3
11	40.310	40.3	26	36.382	36.4
12	39.728	39.7	27	40.704	40.7
13	40.120	40.1	28	38.878	38.9
14	41.532	41.5	29	32.044	32.0
15	34.136	34.1	30	38.676	38.7

Bearing strength was calculated as half of the ultimate failure load in kN.

5.4.1.8. Characteristic capacity for 45mm Intermediate bearing of 90mm flange width.

Table 33 Characteristic 45mm intermediate bearing capacity for a flange width of 90mm with statistical parameters

n	30
\bar{P}_l	38.6
S	3.8
C_V	9.8%
K	1.869
$P_{IB45,90}$	32.0

Note that the same methodology for calculating shear is implemented as per Section 5.2.2. $P_{IB45,90}$ is used to designate the 45mm intermediate bearing for a 90mm flange width.

5.4.2. Intermediate bearing of 90mm width

5.4.2.1. 90mm Intermediate bearing for 40mm flange width.

Table 34 Individual 90mm intermediate bearing results for a flange width of 40mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	25.924	25.9	16	24.916	24.9
2	25.900	25.9	17	24.828	24.8
3	25.690	25.7	18	24.990	25.0
4	24.648	24.6	19	25.470	25.5
5	26.434	26.4	20	25.696	25.7
6	22.794	22.8	21	25.696	25.7
7	27.056	27.1	22	26.614	26.6
8	23.510	23.5	23	25.298	25.3
9	26.322	26.3	24	25.794	25.8
10	25.682	25.7	25	25.716	25.7
11	22.716	22.7	26	26.544	26.5
12	27.234	27.2	27	25.820	25.8
13	24.984	25.0	28	25.820	25.8
14	27.226	27.2	29	24.144	24.1
15	25.658	25.7	30	27.244	27.2

Bearing strength was calculated as half of the ultimate failure load in kN.

5.4.2.2. Characteristic capacity for 90mm Intermediate bearing of 40mm flange width.

Table 35 Characteristic 90mm intermediate bearing capacity for a flange width of 40mm with statistical parameters

n	30
\bar{P}_t	25.5
S	1.2
C_v	4.5%
K	1.869
$P_{IB90,40}$	20.8

Note that the same methodology for calculating shear is implemented as per Section 5.2.2. $P_{IB90,40}$ is used to designate the 90mm intermediate bearing for a 40mm flange width.

5.4.2.3. 90mm Intermediate bearing for 51mm flange width.

Table 36 Individual 90mm intermediate bearing results for a flange width of 51mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	30.332	30.3	16	25.528	25.5
2	29.954	30.0	17	28.400	28.4
3	26.516	26.5	18	29.180	29.2
4	29.508	29.5	19	27.026	27.0
5	27.890	27.9	20	27.408	27.4
6	25.580	25.6	21	31.980	32.0
7	25.298	25.3	22	24.666	24.7
8	28.572	28.6	23	29.012	29.0
9	28.364	28.4	24	31.051	31.1
10	26.340	26.3	25	28.590	28.6
11	30.222	30.2	26	28.642	28.6
12	30.210	30.2	27	32.656	32.7
13	28.530	28.5	28	29.270	29.3
14	29.666	29.7	29	26.458	26.5
15	33.120	33.1	30	30.622	30.6

Bearing strength was calculated as half of the ultimate failure load in kN.

5.4.2.4. Characteristic capacity for 90mm Intermediate bearing of 51mm flange width.

Table 37 Characteristic 90mm intermediate bearing capacity for a flange width of 51mm with statistical parameters

n	30
\bar{P}_l	28.7
S	2.2
C_V	7.5%
K	1.869
$P_{IB90,51}$	23.3

Note that the same methodology for calculating shear is implemented as per Section 5.2.2. $P_{IB90,51}$ is used to designate the 90mm intermediate bearing for a 51mm flange width.

5.4.2.5. 90mm Intermediate bearing for 75mm flange width.

Table 38 Individual 90mm intermediate bearing results for a flange width of 75mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	43.208	43.2	16	45.522	45.5
2	23.184	23.2	17	43.734	43.7
3	37.754	37.8	18	47.074	47.1
4	38.634	38.6	19	44.650	44.7
5	41.928	41.9	20	46.404	46.4
6	42.238	42.2	21	42.888	42.9
7	43.296	43.3	22	46.118	46.1
8	41.930	41.9	23	44.664	44.7
9	44.874	44.9	24	43.186	43.2
10	42.264	42.3	25	42.612	42.6
11	39.950	40.0	26	41.518	41.5
12	42.868	42.9	27	43.838	43.8
13	47.624	47.6	28	45.706	45.7
14	44.538	44.5	29	41.662	41.7
15	46.082	46.1	30	43.382	43.4

Bearing strength was calculated as half of the ultimate failure load in kN.

5.4.2.6. Characteristic capacity for 90mm Intermediate bearing of 75mm flange width.

Table 39 Characteristic 90mm intermediate bearing capacity for a flange width of 75mm with statistical parameters

<i>n</i>	30
\bar{P}_l	42.8
<i>S</i>	4.4
<i>C_V</i>	10.2%
<i>K</i>	1.869
$P_{IB90,75}$	34.8

Note that the same methodology for calculating shear is implemented as per Section 5.2.2. $P_{IB90,75}$ is used to designate the 90mm intermediate bearing for a 75mm flange width.

5.4.2.7. 90mm Intermediate bearing for 90mm flange width.

Table 40 Individual 90mm intermediate bearing results for a flange width of 90mm

Specimen ID	Failure Load (kN)	Shear strength (kN)	Specimen ID	Failure Load (kN)	Shear strength (kN)
1	43.690	43.7	16	34.400	34.4
2	37.880	37.9	17	48.248	48.2
3	46.522	46.5	18	43.964	44.0
4	44.330	44.3	19	43.600	43.6
5	31.254	31.3	20	42.170	42.2
6	45.640	45.6	21	49.634	49.6
7	34.454	34.5	22	39.230	39.2
8	41.560	41.6	23	32.192	32.2
9	47.338	47.3	24	48.170	48.2
10	46.974	47.0	25	44.744	44.7
11	31.578	31.6	26	34.408	34.4
12	38.072	38.1	27	43.606	43.6
13	37.150	37.2	28	42.170	42.2
14	46.090	46.1	29	42.120	42.1
15	42.666	42.7	30	50.358	50.4

Bearing strength was calculated as half of the ultimate failure load in kN.

5.4.2.8. Characteristic capacity for 90mm Intermediate bearing of 90mm flange width.

Table 41 Characteristic 90mm intermediate bearing capacity for a flange width of 90mm with statistical parameters

<i>n</i>	30
\bar{P}_l	41.8
<i>S</i>	5.5
<i>C_V</i>	13.2%
<i>K</i>	1.869
$P_{IB90,90}$	34.0

Note that the same methodology for calculating shear is implemented as per Section 5.2.2. $P_{IB90,90}$ is used to designate the 90mm intermediate bearing for a 90mm flange width.