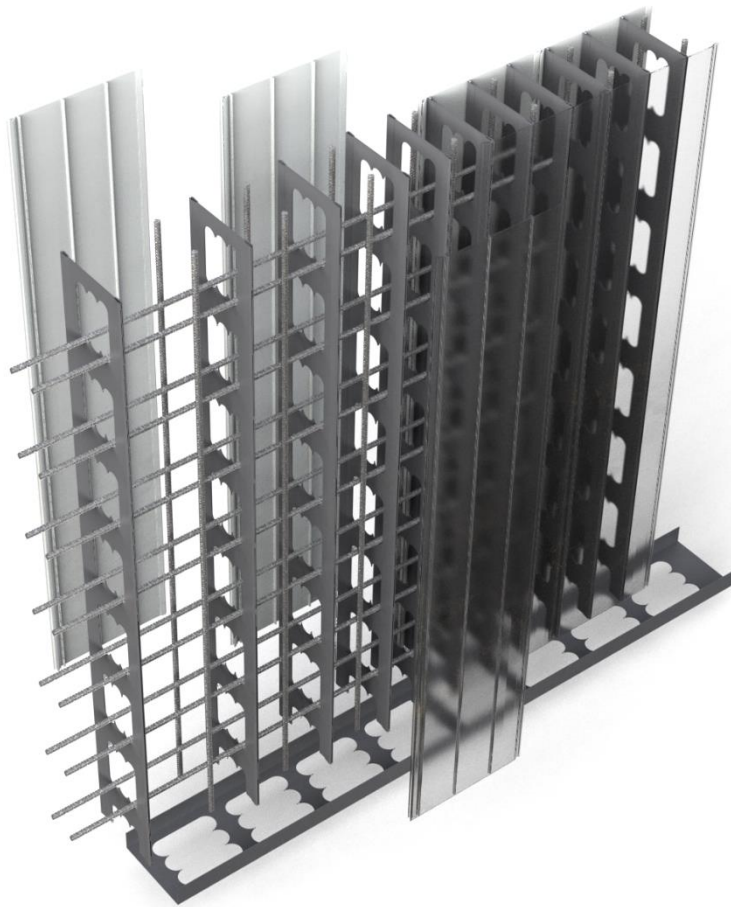




CLEARFORM



DESIGN METHOD FOR WALLS
SUBJECT TO VERTICAL
COMPRESSION FORCES

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Date: March 2023
Version: 1.0

1

SIMPLIFIED DESIGN METHOD FOR WALLS / BLADE COLUMNS
SUBJECT TO VERTICAL COMPRESSION FORCES
AS 3600:2018

Limitation on use of following tables or charts refer to section 11.5 of AS3600:2018 ϕN_u

Design axial strength per unit length of a braced wall in compression.

ϕ	= 0.65
N_u	= $(t_w - 1.2e - 2e_a) 0.6 f'_c$
t_w	= thickness of the wall in mm
N_u	= ultimate strength per unit length of wall
e	determined in accordance with clause 11.5.4 = eccentricity of load measured perpendicular to the plane of the wall
e_a	= An additional eccentricity taken as $(Hwe)^2/2500t_w$
f'_c	= characteristic compressive strength of concrete at 28 days - MPa

Effective heights:

H_{we}	= kH_w
H_w	= actual wall height in mm (vertical clear distance between supports)
k	= 0.75 where restraint against rotation is provided at both ends.
k	= 1.0 where no restraint against rotation is provided at one or both ends.

Note:

Design axial strength of wall Hwe/t_w
 ≤ 30

*1) This walls/blade column design applies only to vertical force when wall eccentricity $e \leq t_w/6$. AS3600-2018

*2) Blade column ratio of the long cross section dimension of column's equal to or greater than 4 times the shorter cross section dimensions AS3600-2018.

11.5.2 LIMITATION ON USE OF METHOD

Structural walls designed using Clause 11.5.3 shall -

- a) be limited to a maximum design axial stress of 3 MPa unless vertical and horizontal reinforcement is provided on both wall faces and divided equally between the two wall faces;
- b) not be constructed on sites with soil classification of De or Ee, as defined in AS 1170.4, and where subjected to earthquake design actions; and
- c) have a ratio of effective height to thickness that does not exceed 20 for singly reinforced walls or 30 for doubly reinforced wall.

Otherwise, the wall shall be designed as a column in accordance with Section 10.

11.5.4 ECCENTRICITY OF VERTICAL LOAD

The eccentricity of a vertical load applied to the top of a wall shall be determined as follows:

- a) The eccentricity of the load applied by the floor (or roof) supported by the top of the wall being designed shall be taken as -
 - i) for a discontinuous floor, one third of the depth of the bearing area measured from the span face of the wall;
 - ii) for a cast in situ concrete floor continuous over the wall, zero.
- b) The eccentricity of the aggregated load from all floors above the floor at the top of the wall being designed may be taken to be zero.

The resultant eccentricity of the total load from (a) and (b) shall be calculated but taken as not less than $0.05t_w$.

110/107MM CLEARFORM WALL AXIAL VERTICAL COMPRESSION CAPACITY ONLY

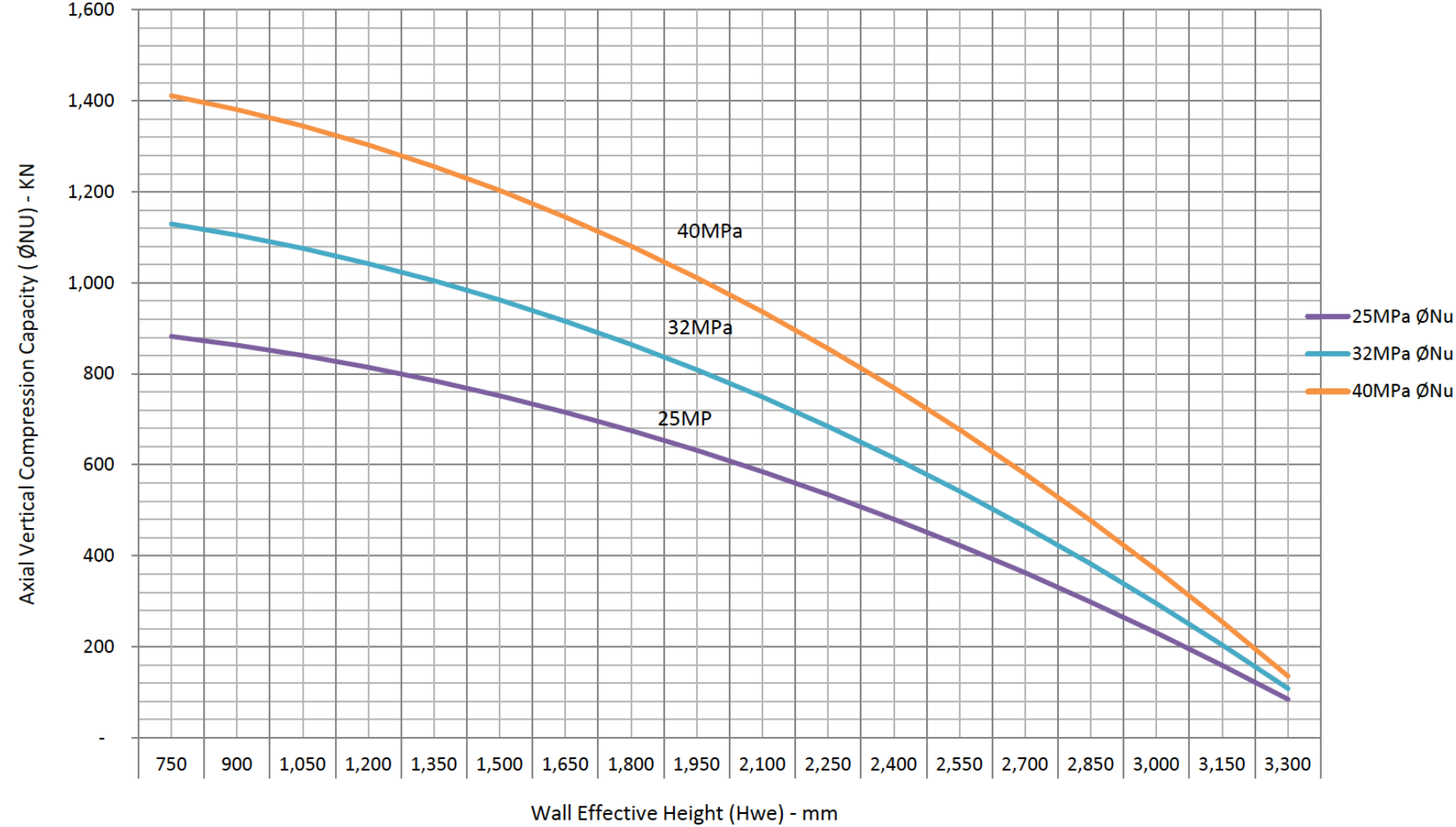
110mm profile CLEARFORM wall, concrete thickness: $t_w = 107\text{mm}$, $\phi = 0.65$

Hwe mm	Unreinforced wall	ϕN_u (kN/m) $e = 0.05 t_w$			Unreinforced wall	ϕN_u (kN/m) $e = t_w/6$		
		$f'_c = 25\text{MPa}$	$f'_c = 32\text{MPa}$	$f'_c = 40\text{MPa}$		25MPa	32MPa	40MPa
750	106	882	1129	1412	89	744	953	1191
900	104	863	1105	1381	87	725	928	1160
1050	101	841	1076	1348	84	703	899	1124
1200	98	814	1043	1303	81	677	866	1083
1350	94	785	1005	1256	78	647	828	1035
1500	90	752	962	1203	74	614	786	982
1650	86	715	916	1145	69	578	739	924
1800	81	675	865	1081	65	538	688	860
1950	76	632	809	1011	59	494	633	791
2100	70	585	749	936	54	447	572	716
2250	64	535	684	856	48	397	508	635
2400	58	481	615	769	41	343	439	549
2550	51	423	542	678	34	286	366	457
2700	44	363	464	580	27	225	288	360
2850	36	298	382	477	19	161	205	257
3000	28	231	295	369	11	93	119	148
3150	19	159	204	255	3	22	28	34
3300	10	85	108	135				

Ratio of effective height to thickness $H_{we}/t_w \leq 20$ shown below the double line drawn across the chart.

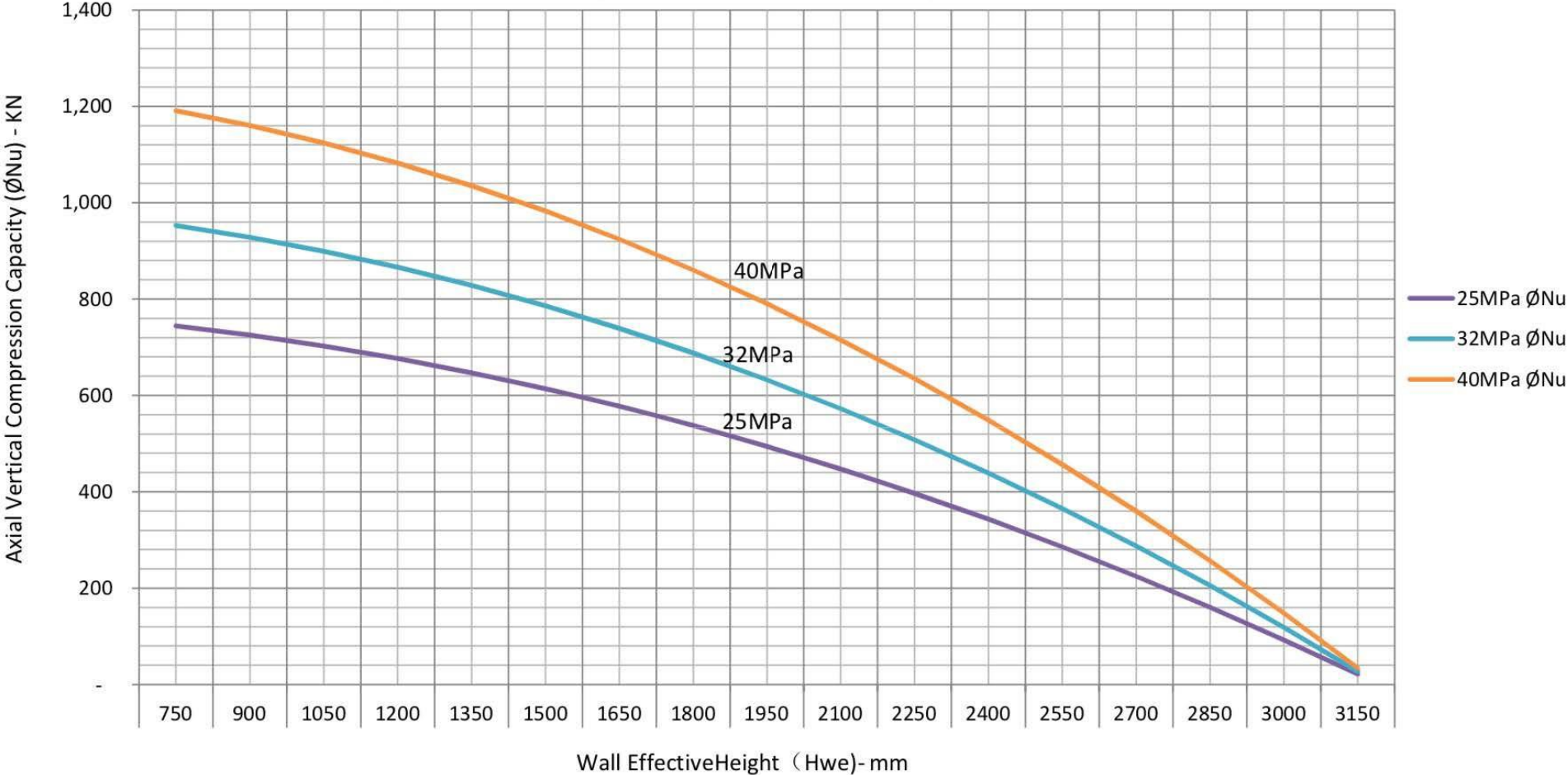
2A. 110MM CONCRETE CLEARFORM WALL AXIAL VERTICAL COMPRESSION CAPACITY
AS 3600 - 2018: SECTION 11
 $e = 0.05t_w$

(Fire resistance design not included in the chart below)



2B. 110MM CONCRETE CLEARFORM WALL AXIAL VERTICAL COMPRESSION CAPACITY
AS 3600 - 2018: SECTION 11
 $e = tw/6$

(Fire resistance design not included in the chart below)



155/150MM CLEARFORM WALL AXIAL VERTICAL COMPRESSION CAPACITY ONLY

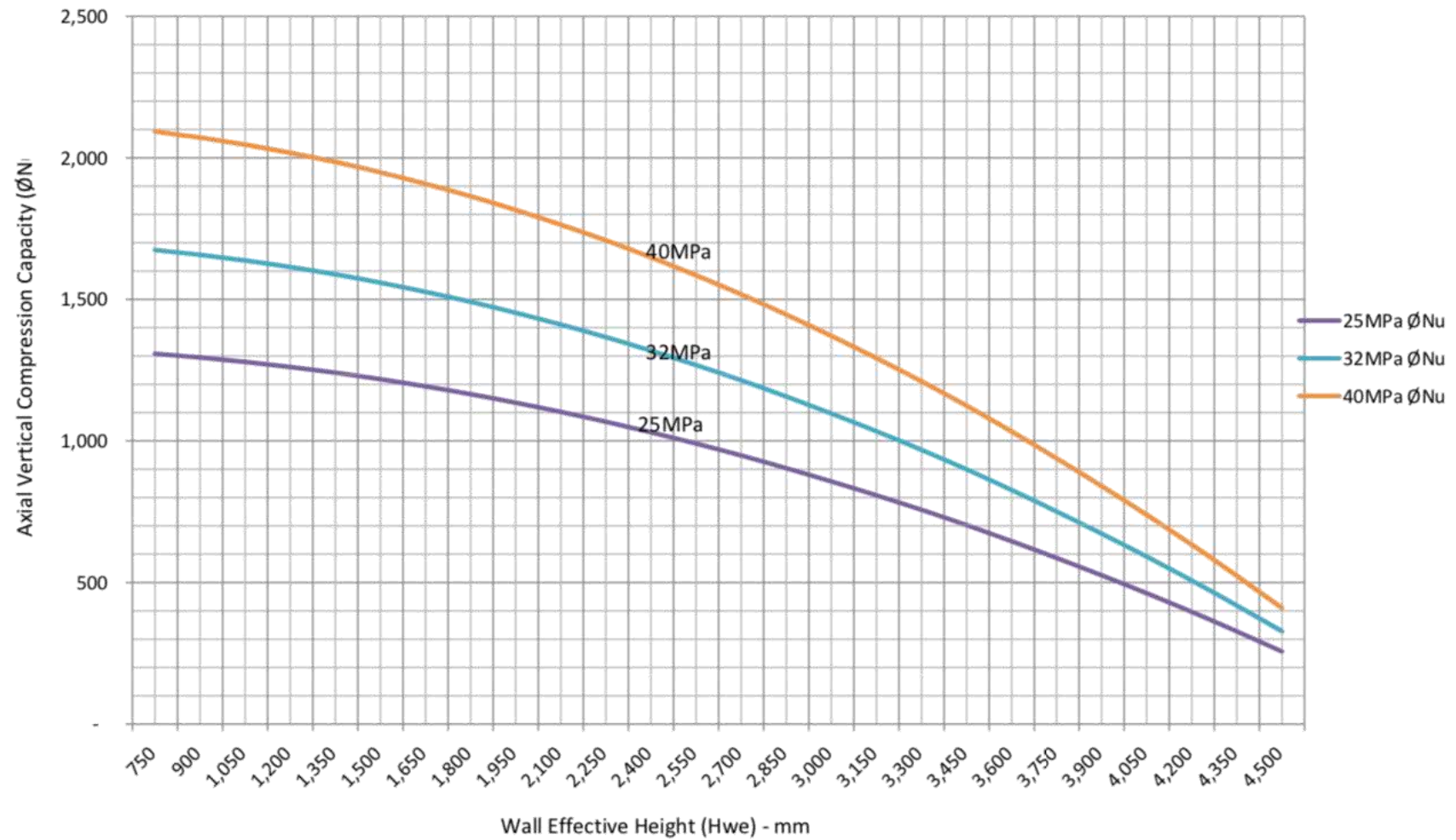
155mm profile CLEARFORM wall, concrete thickness: $t_w = 150\text{mm}$, $\phi = 0.65$

ϕN_u (kN/m) $e = 0.05 t_w$					ϕN_u (kN/m) $e = t_w/6$			
Hwe	Unreinforced				Unreinforced			
mm	wall	$f'_c=25\text{MPa}$	$f'_c=32\text{MPa}$	$f'_c=40\text{MPa}$	wall	25MPa	32MPa	40MPa
750	157	1308	1674	2093	133	1109	1419	1774
900	155	1295	1657	2072	131	1096	1402	1753
1050	154	1279	1637	2047	130	1080	1382	1728
1200	151	1261	1614	2018	127	1062	1359	1699
1350	149	1241	1588	1985	125	1041	1333	1666
1500	146	1218	1559	1949	122	1019	1304	1630
1650	143	1193	1527	1908	119	993	1271	1589
1800	140	1165	1491	1864	116	966	1236	1545
1950	136	1135	1453	1816	112	936	1198	1497
2100	132	1102	1411	1764	108	903	1156	1445
2250	128	1068	1367	1708	104	868	1111	1389
2400	124	1030	1319	1649	100	831	1064	1330
2550	119	991	1268	1585	95	791	1013	1266
2700	114	949	1214	1518	90	749	959	1199
2850	108	904	1157	1447	85	705	902	1128
3000	103	857	1097	1372	79	658	842	1053
3150	97	808	1034	1293	73	609	779	975
3300	91	756	968	1210	67	557	713	891
3450	84	702	899	1124	60	503	644	805
3600	77	646	827	1033	54	446	571	714
3750	70	587	751	939	47	388	496	620
3900	63	526	673	841	39	326	418	522
4050	55	462	591	739	32	263	336	420
4200	47	396	506	633	24	196	251	314
4350	39	327	419	523	15	128	164	205
4500	31	256	328	410	7	57	73	91

Ratio of effective height to thickness $Hwe/t_w \leq 20$ shown below the double line drawn across the chart.

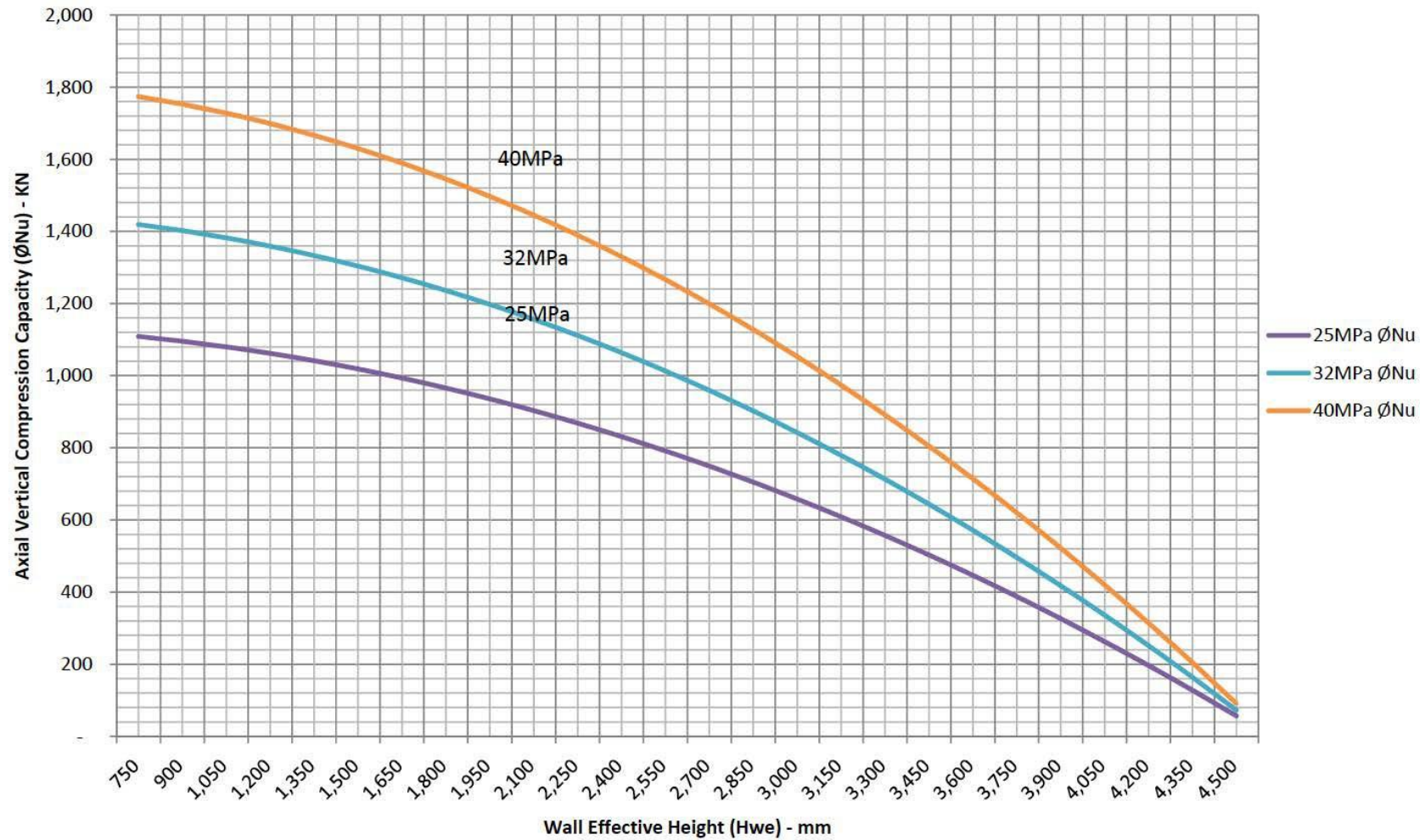
3A. 155MM CONCRETE CLEARFORM WALL AXIAL VERTICAL COMPRESSION CAPACITY
AS 3600 - 2018: SECTION 11
 $e = 0.05t_w$

(Fire resistance design not included in the chart below)



3B. 155MM CONCRETE CLEARFORM WALL AXIAL VERTICAL COMPRESSION CAPACITY
AS 3600 - 2018: SECTION 11
 $e = tw/6$

(Fire resistance design not included in the chart below)



200/195MM CLEARFORM WALL
AXIAL VERTICAL COMPRESSION CAPACITY ONLY

200mm profile CLEARFORM wall, concrete thickness: $t_w = 195\text{mm}$, $\emptyset = 0.65$

		$\emptyset N_u$ (kN/m) $e = 0.05 t_w$			$\emptyset N_u$ (kN/m) $e = t_w/6$			
Hwe	Unreinforced				Unreinforced			
mm	wall	$f'_c=25\text{MPa}$	$f'_c=32\text{MPa}$	$f'_c=40\text{MPa}$	wall	25MPa	32MPa	40MPa
750	204	1700	2176	2719	173	1443	1847	2309
900	203	1689	2162	2703	172	1433	1834	2292
1050	201	1677	2147	2684	170	1421	1818	2273
1200	200	1663	2129	2661	169	1407	1801	2251
1350	198	1647	2109	2636	167	1391	1780	2225
1500	196	1630	2086	2607	165	1373	1758	2197
1650	193	1610	2061	2576	162	1353	1732	2166
1800	191	1589	2033	2542	160	1332	1705	2133
1950	188	1565	2044	2504	157	1309	1675	2094
2100	185	1540	1971	2464	154	1283	1643	2053
2250	182	1513	1937	2421	151	1256	1608	2010
2400	178	1484	1900	2374	147	1227	1571	1964
2550	174	1453	1860	2325	144	1197	1532	1915
2700	170	1421	1818	2273	140	1164	1490	1862
2850	166	1386	1774	2218	136	1129	1446	1807
3000	162	1350	1728	2159	131	1093	1399	1749
3150	157	1311	1679	2098	127	1055	1350	1688
3300	153	1271	1627	2034	122	1015	1299	1623
3450	148	1229	1573	1967	117	973	1245	1556
3600	142	1185	1517	1897	111	929	1189	1486
3750	137	1140	1459	1823	106	883	1130	1413
3900	131	1092	1398	1747	100	835	1069	1337
4050	125	1042	1334	1668	94	786	1006	1257
4200	119	991	1269	1586	88	735	940	1175
4350	113	938	1201	1501	82	681	872	1090
4500	106	883	1130	1413	75	626	802	1002
4650	99	826	1057	1321	68	569	729	911
4800	92	767	982	1227	61	510	563	817
4950	85	706	904	1130	54	450	476	720
5100	77	644	824	1030	48	387	496	620
5250	70	579	742	927	39	323	413	517
5400	62	513	657	821	31	257	328	411
5550	53	445	570	712	23	188	241	301
5700	45	375	480	600	14	118	152	189
5850	36	303	388	485	6	47	60	74

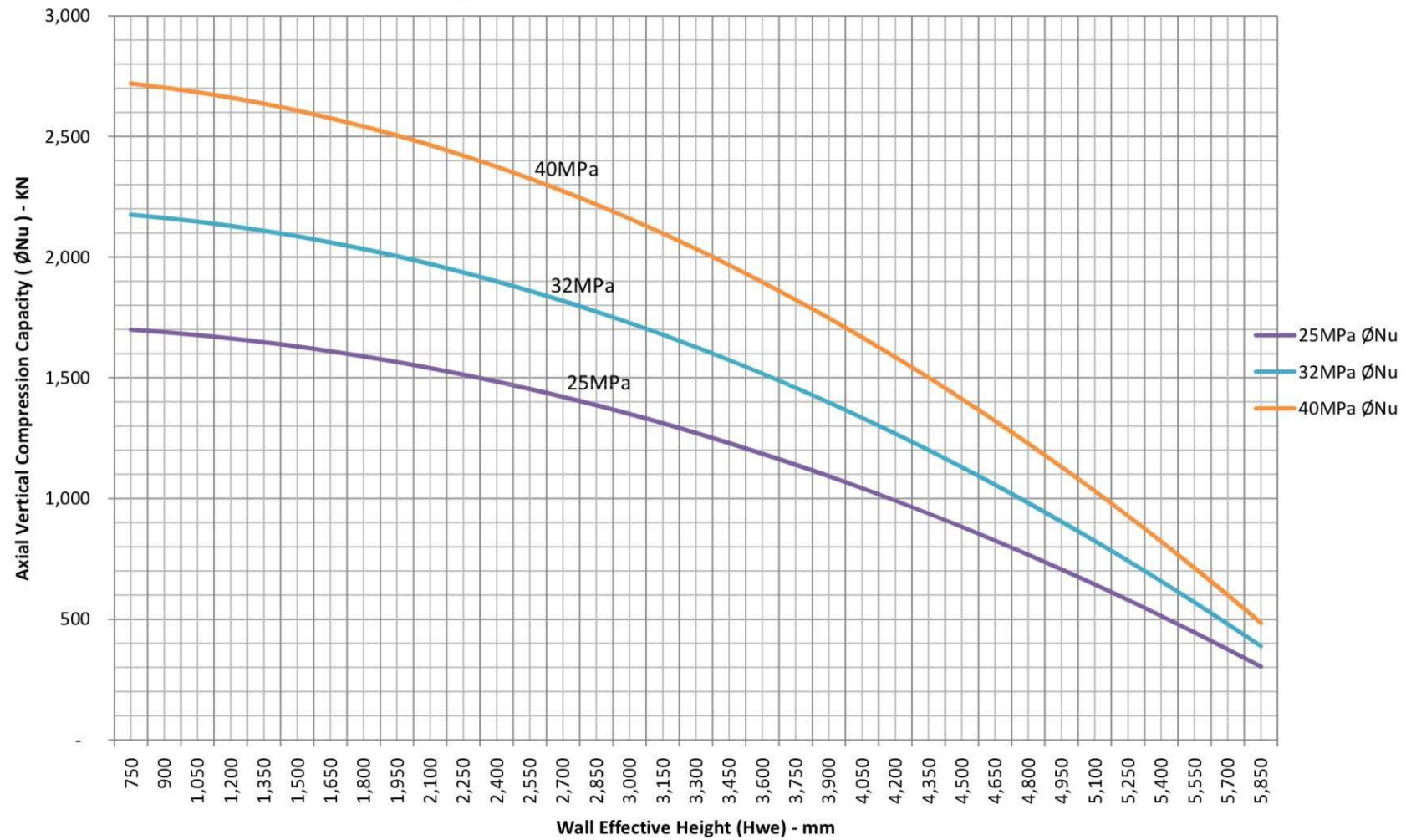
Ratio of effective height to thickness $Hwe/t_w \leq 20$ shown below the double line drawn across the chart.

4A. 200MM CONCRETE CLEARFORM WALL AXIAL VERTICAL COMPRESSION CAPACITY

AS 3600 - 2018: SECTION 11

$$e = tw/0.05tw$$

(Fire resistance design not included in the chart below)

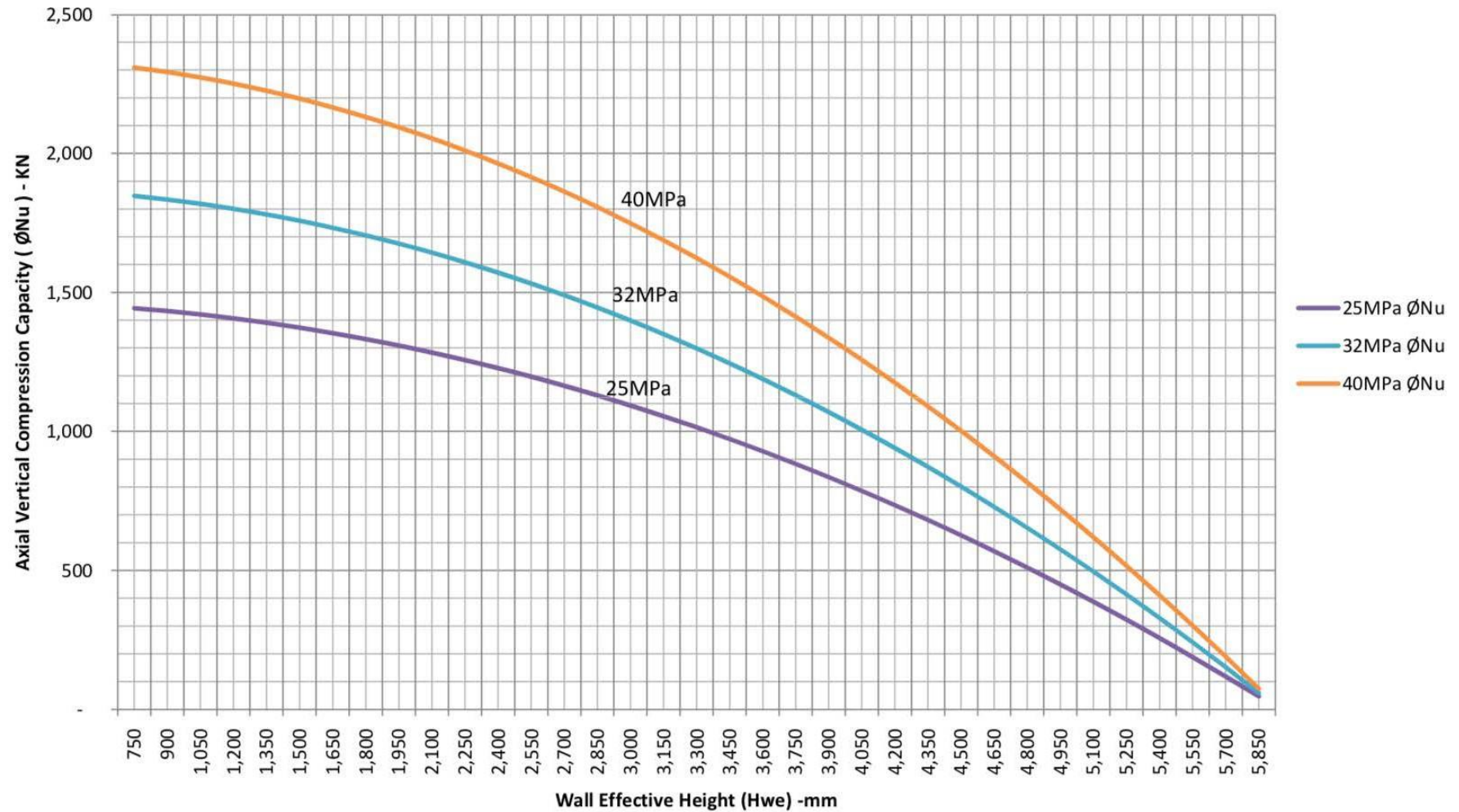


4B. 200MM CONCRETE CLEARFORM WALL AXIAL VERTICAL COMPRESSION CAPACITY

AS 3600 - 2018: SECTION 11

$$e = tw/6$$

(Fire resistance design not included in the chart below)



250/245MM CLEARFORM WALL AXIAL VERTICAL COMPRESSION CAPACITY ONLY

250mm profile CLEARFORM wall, concrete thickness: $t_w = 245\text{mm}$, $\phi = 0.65$

Hwe mm	ϕN_u (kN/m) $e = 0.05 t_w$				ϕN_u (kN/m) $e = t_w/6$			
	Unreinforced wall	$f'_c = 25\text{MPa}$	$f'_c = 32\text{MPa}$	$f'_c = 40\text{MPa}$	Unreinforced wall	25MPa	32MPa	40MPa
750	258	2154	2757	3446	220	1830	2342	2928
900	257	2145	2746	3433	219	1822	2332	2915
1050	256	2136	2734	3417	217	1812	2320	2900
1200	255	2125	2720	3400	216	1801	2306	2882
1350	253	2112	2704	3379	215	1789	2289	2862
1500	252	2098	2686	3357	213	1775	2271	2839
1650	250	2083	2666	3332	211	1759	2252	2814
1800	248	2065	2644	3305	209	1742	2230	2787
1950	246	2047	2620	3275	207	1723	2206	2758
2100	243	2027	2595	3243	204	1703	2180	2726
2250	241	2005	2567	3209	202	1682	2153	2691
2400	238	1983	2538	3172	199	1659	2124	2654
2550	235	1958	2506	3133	196	1635	2092	2615
2700	232	1932	2473	3091	193	1609	2059	2574
2850	229	1905	2438	3048	190	1581	2024	2530
3000	225	1876	2401	3001	186	1552	1987	2484
3150	221	1846	2362	2953	183	1522	1948	2435
3300	218	1814	2322	2902	179	1490	1907	2384
3450	214	1780	2279	2849	175	1457	1865	2331
3600	209	1746	2234	2793	171	1422	1820	2275
3750	205	1709	2188	2735	166	1386	1774	2217
3900	201	1672	2140	2674	162	1348	1725	2157
4050	196	1632	2089	2612	157	1309	1675	2094
4200	191	1592	2037	2546	152	1268	1623	2029
4350	186	1549	1983	2476	147	1226	1569	1961
4500	181	1506	1927	2409	142	1182	1513	1891
4650	175	1460	1869	2337	137	1137	1455	1819
4800	170	1414	1810	2262	131	1090	1396	1745
4950	164	1366	1748	2185	125	1042	1334	1668
5100	158	1316	1685	2106	119	993	1270	1588
5250	152	1265	1619	2024	113	941	1205	1506
5400	145	1212	1552	1940	107	889	1138	1422
5550	139	1158	1483	1853	100	835	1069	1336
5700	132	1103	1412	1765	94	779	998	1247
5850	125	1046	1339	1673	87	722	925	1156
6000	118	987	1264	1580	80	664	850	1062
6150	111	927	1187	1484	72	604	773	966
6300	104	866	1108	1385	65	542	694	868
6450	96	803	1028	1285	58	479	614	767

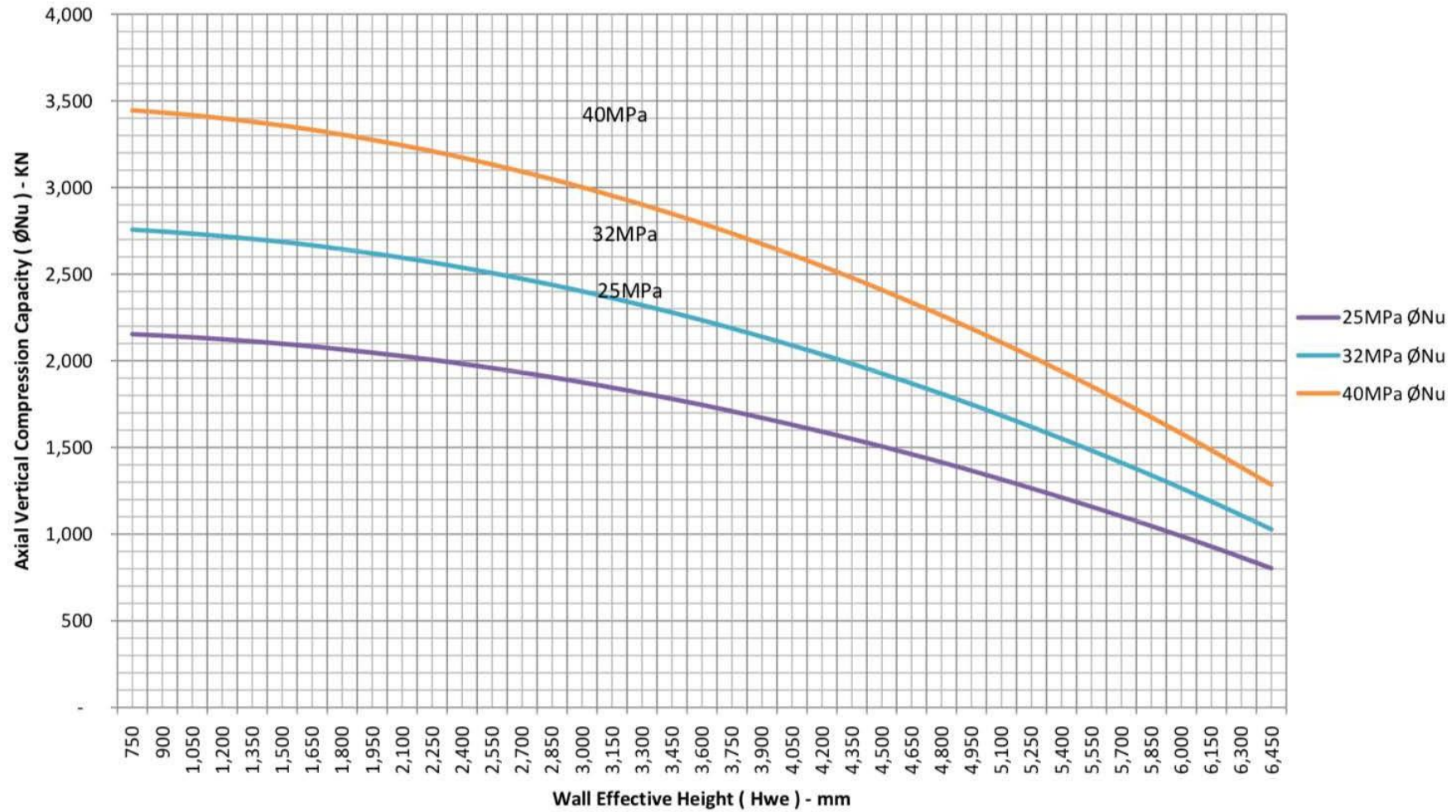
Ratio of effective height to thickness $H_{we}/t_w \leq 20$ shown below the double line drawn across the chart

5A. 250MM CONCRETE CLEARFORM WALL AXIAL VERTICAL COMPRESSION CAPACITY

AS 3600 - 2018: SECTION 11

$$e = tw/0.05tw$$

(Fire resistance design not included in the chart below)



5B. 250MM CONCRETE CLEARFORM WALL AXIAL VERTICAL COMPRESSION CAPACITY

AS 3600 - 2018: SECTION 11

$$e = tw/6$$

(Fire resistance design not included in the chart below)

