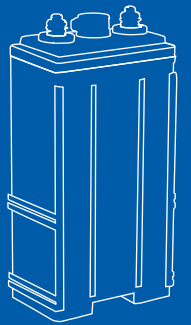


norwatt@norwatt.es

www.norwatt.es

XHP

Low maintenance
high performance
batteries



Reliability inside

ALCAD

Low maintenance, high performance Ni-Cd batteries

Powerful assurance for critical applications

depend upon XHP where vital UPS, engine starting and emergency back-up duties need guaranteed power in an instant. The built-in reliability of sintered/pbe technology and alkaline electrolyte provides up to 20+ years of cost-effective trouble-free service, requiring virtually no maintenance.

Future-proof construction

XHP's steel superstructure and tough polypropylene casing hold sintered and plastic-bonded electrodes with copious amounts of alkaline electrolyte. As none of these materials are corrosive, XHP confidently outperforms lead acid batteries by several years. On-going maintenance, unexpected downtime and replacement costs are completely eliminated with Ni-Cd. XHP batteries only require topping-up every 10 years after single rate charging.

Predictable cost and long life

Owing to its reliability, unique electrochemistry and sturdy construction, accurately predicting your battery's life-cost is now possible. XHP can easily repay your investment within 3-6 years – well within the lifetime of your application.

Reliable in all conditions

XHP is specified onshore for hospitals, traffic control, power generation and process control, and offshore in oil and gas exploration and other hazardous marine installations, where the implications of main power supply interruption cannot be contemplated.

Generally operating between temperatures of -20°C to $+50^{\circ}\text{C}$ (-4°F to $+122^{\circ}\text{F}$), XHP batteries can tolerate extremes of -50°C to $+70^{\circ}\text{C}$ (-58°F to $+158^{\circ}\text{F}$) for short periods. They can also remain in storage for many years before commissioning without affecting subsequent performance.



Best for engines – perfect for UPS

Electrical abuses such as AC ripple, over-discharging, voltage reversal or high overcharge currents have no effect upon XHP. The battery's plate and separator format make recharging quick and efficient at either single or dual rate.

Delivery of high power within a narrow voltage window perfectly suits XHP for UPS duties. There is no risk of sudden death, and because Ni-Cd batteries do not produce corrosive fumes, they can be installed next to sensitive electronic equipment. Even when partially discharged XHP is capable of providing repeated high currents up to 20 times its nominal capacity to make short work of starting your diesel engine or gas turbine.

Battery sizing made easy

An XHP battery can be designed to exactly match your installation criteria. With BaSics sizing software, calculations are quick and easy. Engineers are always available when you require additional expert advice.

Original equipment or replacement

From a broad range of sizes, weights and performances available, XHP can perfectly meet your requirement for guaranteed power.

Setting standards worldwide

XHP batteries satisfy all major electrical industry standards and are approved for operation on board ships and offshore installations.

Alcad recycle

Alcad also recycle old batteries as part of their responsibility to safeguard the environment.

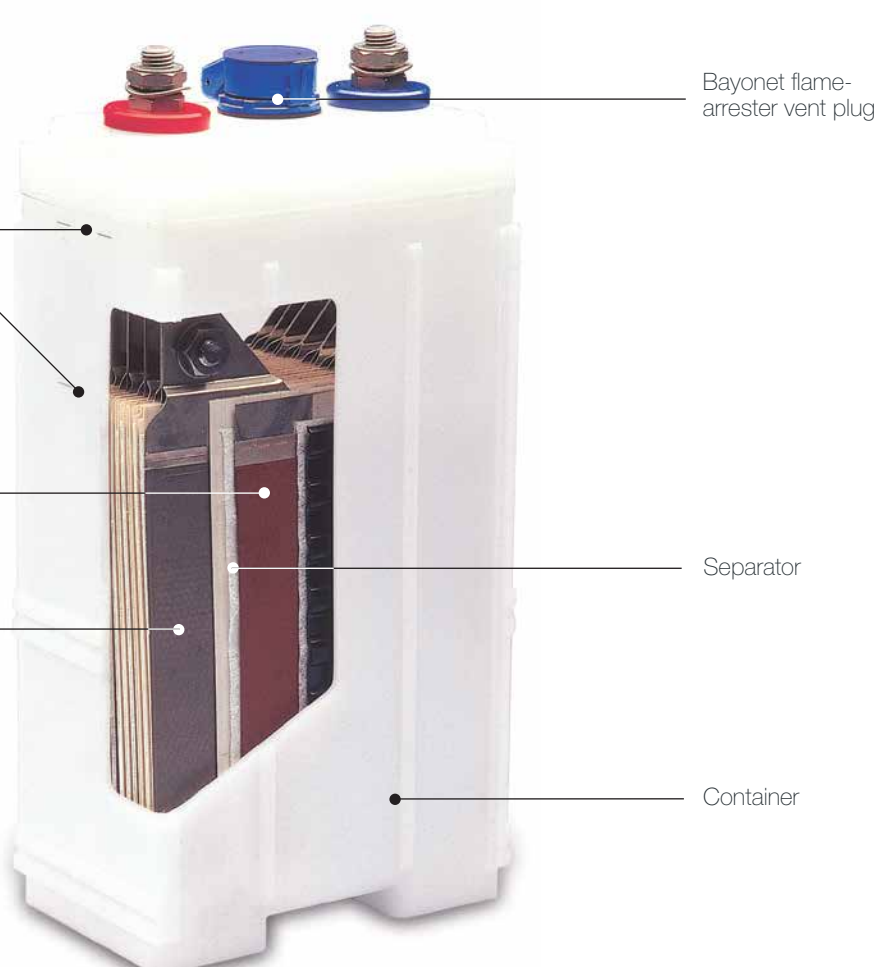
XHP Range

XHP



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Large electrolyte reserve with visible levels

Plastic-bonded negative electrode

Sintered positive electrode

Bayonet flame-arrester vent plug

Separator

Container

Rapid charging characteristics

(+ 20 °C ± 5 °C / + 68 °F ± 9 °F)

XHP can be charged by all normal methods:

- Taper
- Constant current
- Constant voltage
- Pulse

The cells continue to operate satisfactorily in any state of charge. For operating conditions other than fully charged, consult Alcad.

Capacity

The rated capacity (C_5) of a cell is the capacity available in ampere-hours (Ah) at the 5 hour discharge rate to an end voltage of 1.00 V/cell.

Nominal discharge voltage

The nominal discharge voltage is 1.2 V/cell.

Constant current charging

Standard charge 0.2 x C_5 amperes for 8 hours.

Constant voltage charging

No current limit is necessary.

With boost

Maintenance float voltage: 1.40 ± 0.01 V
Boost voltage range: 1.45 V ± 0.01 V

Without boost

Float voltage: 1.41 V ± 0.01 V
These voltages are applicable from +20°C to +25°C (+68°F to +77°F)

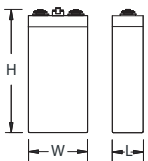
Cell data

D.C. internal resistance: 40 x 1/ C_5 mΩ
Short circuit current: 1.8 x cell discharge current at 1 s to 0.65 V

Capacity and dimensions

XHP type	Capacity at the 5hr rate (Ah)	Length per cell		Width per cell		Overall height		Approx. weight per cell		Volume of liquid electrolyte above plates (cc)
		(mm)	L (in)	(mm)	W (in)	(mm)	H (in)	(kg)	(lb)	
XHP 11	11	46.5	1.8	86	3.4	196	7.2	1.0	2.2	66
XHP 16	16	46.5	1.8	86	3.4	276	10.9	1.5	3.5	160
XHP 21	21	46.5	1.8	86	3.4	276	10.9	1.6	3.5	160
XHP 24	24	46.5	1.8	86	3.4	276	10.9	1.7	3.8	160
XHP 28	28	61	2.4	86	3.4	276	10.9	2.0	4.4	215
XHP 36	36	86	3.4	86	3.4	276	10.9	2.7	6.0	325
XHP 45	45	86	3.4	86	3.4	276	10.9	2.9	6.4	315
XHP 52	52	86	3.4	86	3.4	276	10.9	2.9	6.4	315
XHP 60	60	86	3.4	86	3.4	306	12.1	3.4	7.5	405
XHP 70	70	86	3.4	86	3.4	306	12.1	3.5	7.5	405
XHP 80	80	86	3.4	86	3.4	306	12.1	3.5	7.5	390
XHP 90	90	78	3.1	166	6.5	339	13.4	5.8	12.8	750
XHP 100	100	78	3.1	166	6.5	339	13.4	6.1	13.5	735
XHP 115	115	78	3.1	166	6.5	339	13.4	6.3	13.9	720
XHP 130	130	87	3.4	166	6.5	339	13.4	7.0	15.4	815
XHP 150	150	103	4.1	166	6.5	339	13.4	8.2	18.1	990
XHP 170	170	117	4.6	166	6.5	339	13.4	9.7	21.6	1135
XHP 190	190	117	4.6	166	6.5	339	13.4	10.0	22.3	1115
XHP 220	220	198	7.9	166	6.5	339	13.4	14.7	32.4	2155
XHP 250	250	198	7.9	166	6.5	339	13.4	15.3	33.7	2120
XHP 280	280	198	7.9	166	6.5	339	13.4	15.8	34.6	2080
XHP 300	300	198	7.9	166	6.5	339	13.4	16.1	35.5	2060
XHP 320	320	198	7.9	166	6.5	339	13.4	16.5	36.2	2030

Alcad XHP batteries fulfil all requirements specified by IEC publication 60623. Flame retardant (F) option available. Please add 1.5% to dimensions.



Terminals

XHP 11 - XHP 80	M10
XHP 90 - XHP 150	M12
XHP 170 - XHP 320	2 x M12

Data for stationary applications

Performance after prolonged float charge of fully charged cells

Available amperes at +20 °C ± 5 °C / +68 °F ± 9 °F

Final voltage: 1.00 V/cell

XHP type	C ₅ Ah	HOURS				MINUTES								SECONDS		
		8 h	5 h	3 h	2 h	90 min	60 min	30 min	20 min	15 min	10 min	5 min	1 min	30 s	5 s	1 s
XHP 11	11	1.4	2.2	3.6	5.4	7.2	10.6	20.6	29.6	35.9	45.3	52.8	66.2	73.1	90.1	99.8
XHP 16	16	2.0	3.2	5.3	7.9	10.4	15.4	30.0	43.0	52.3	65.8	76.8	96.4	107	132	145
XHP 21	21	2.7	4.2	7.0	10.4	13.7	20.3	39.4	56.5	68.6	86.4	101	127	140	173	191
XHP 24	24	3.0	4.8	8.0	11.8	15.7	23.1	45.0	64.6	78.4	98.8	115	145	160	197	218
XHP 28	28	3.6	5.6	9.3	13.8	18.3	27.0	52.5	75.3	91.4	115	135	169	187	230	254
XHP 36	36	4.6	7.2	11.9	17.8	23.5	34.7	67.5	96.8	118	148	173	216	240	295	328
XHP 45	45	5.7	9.0	14.9	22.2	29.4	43.4	84.4	121	147	185	217	271	300	369	410
XHP 52	52	6.6	10.4	17.2	25.6	33.9	50.1	97.5	140	170	214	250	313	346	426	473
XHP 60	60	7.5	12.0	19.9	29.6	39.2	57.9	112	159	190	225	250	308	337	402	443
XHP 70	70	8.8	14.0	23.2	34.5	45.7	67.5	130	186	221	263	292	360	394	469	517
XHP 80	80	10.2	16.0	26.5	39.4	52.2	77.1	149	212	253	300	334	411	449	536	591
XHP 90	90	11.4	18.0	29.8	44.4	58.7	86.8	165	230	268	317	375	511	574	701	754
XHP 100	100	12.7	20.0	33.1	49.3	65.3	96.4	183	255	297	352	417	568	638	779	838
XHP 115	115	14.6	23.0	38.1	56.7	75.1	111	210	293	342	405	479	653	733	896	964
XHP 130	130	16.5	26.0	43.1	64.1	84.9	125	238	332	386	458	542	738	829	1010	1090
XHP 150	150	19.0	30.0	49.7	74.0	97.9	145	274	383	446	528	625	852	957	1170	1260
XHP 170	170	21.6	34.0	56.3	83.8	111	164	311	434	505	599	708	965	1080	1320	1420
XHP 190	190	24.1	38.0	63.0	93.7	124	183	347	485	565	669	791	1080	1210	1480	1590
XHP 220	220	27.9	44.0	72.9	108	143	212	402	561	654	775	916	1250	1400	1710	1840
XHP 250	250	31.7	50.0	82.8	123	163	241	457	638	743	881	1040	1420	1590	1950	2100
XHP 280	280	35.5	56.0	92.8	138	182	270	512	714	832	986	1170	1590	1790	2180	2350
XHP 300	300	38.1	60.0	99.4	147	195	289	548	765	892	1060	1250	1700	1910	2340	2510
XHP 320	320	40.6	64.0	106	157	208	309	585	816	951	1130	1330	1820	2040	2490	2680

Available amperes at +20 °C ± 5 °C / +68 °F ± 9 °F

Final voltage: 1.05 V/cell

XHP type	C ₅ Ah	HOURS				MINUTES								SECONDS		
		8 h	5 h	3 h	2 h	90 min	60 min	30 min	20 min	15 min	10 min	5 min	1 min	30 s	5 s	1 s
XHP 11	11	1.4	2.2	3.6	5.4	7.1	10.5	20.2	27.5	32.7	38.3	43.9	55.3	62.3	76.9	85.6
XHP 16	16	2.0	3.2	5.3	7.8	10.3	15.2	29.4	40.0	47.5	55.7	63.9	80.4	90.5	112	125
XHP 21	21	2.6	4.2	6.9	10.3	13.5	20.0	38.5	52.5	62.4	73.1	83.9	106	119	147	164
XHP 24	24	3.0	4.8	7.9	11.8	15.5	22.9	44.0	60.0	71.3	83.6	95.9	121	136	168	187
XHP 28	28	3.5	5.6	9.2	13.7	18.1	26.7	51.4	70.0	83.2	97.5	112	141	159	196	218
XHP 36	36	4.5	7.1	11.8	17.6	23.2	34.3	66.1	90.0	107	125	144	181	204	252	280
XHP 45	45	5.7	8.9	14.8	22.1	29.0	42.9	82.6	113	134	157	180	226	255	315	350
XHP 52	52	6.5	10.3	17.1	25.5	33.5	49.5	95.4	130	154	181	208	261	294	364	405
XHP 60	60	7.5	11.9	19.7	29.4	38.7	57.1	109	145	168	187	206	257	285	342	373
XHP 70	70	8.8	13.9	23.0	34.3	45.2	66.7	127	169	196	218	240	300	333	399	436
XHP 80	80	10.1	15.9	26.3	39.2	51.6	76.2	145	193	223	249	274	343	380	456	498
XHP 90	90	11.3	17.9	29.6	44.1	58.1	85.7	157	202	230	262	307	435	490	600	650
XHP 100	100	12.6	19.8	32.9	49.0	64.5	95.2	175	225	256	291	341	483	544	667	723
XHP 115	115	14.5	22.8	37.8	56.4	74.2	110	201	259	294	335	393	556	626	767	831
XHP 130	130	16.4	25.8	42.8	63.7	83.9	124	227	292	332	379	444	628	708	867	940
XHP 150	150	18.9	29.8	49.3	73.5	96.8	143	262	337	383	437	512	725	817	1000	1080
XHP 170	170	21.4	33.7	55.9	83.3	110	162	297	382	434	495	580	821	925	1130	1230
XHP 190	190	23.9	37.7	62.5	93.1	123	181	332	427	485	553	648	918	1030	1270	1370
XHP 220	220	27.7	43.7	72.4	108	142	210	384	495	562	641	751	1060	1200	1470	1590
XHP 250	250	31.4	49.6	82.2	123	161	238	436	562	639	728	853	1200	1360	1670	1810
XHP 280	280	35.2	55.6	92.1	137	181	267	489	630	715	816	956	1350	1520	1870	2020
XHP 300	300	37.7	59.5	98.7	147	194	286	524	675	767	874	1020	1450	1630	2000	2170
XHP 320	320	40.3	63.5	105	157	207	305	559	719	818	932	1090	1550	1740	2130	2310

XHP

Data for stationary applications

Performance after prolonged float charge of fully charged cells

Available amperes at +20 °C ± 5 °C / +68 °F ± 9 °F

Final voltage: 1.10 V/cell

XHP type	C ₅ Ah	HOURS				MINUTES								SECONDS		
		8 h	5 h	3 h	2 h	90 min	60 min	30 min	20 min	15 min	10 min	5 min	1 min	30 s	5 s	1 s
XHP 11	11	1.4	2.2	3.5	5.3	6.9	9.9	17.6	22.5	25.8	29.8	34.9	45.1	51.6	64.0	71.3
XHP 16	16	2.0	3.1	5.2	7.6	10.0	14.4	25.5	32.8	37.5	43.3	50.7	65.6	75.1	93.1	104
XHP 21	21	2.6	4.1	6.8	10.0	13.2	18.9	33.5	43.0	49.2	56.8	66.6	86.0	98.6	122	136
XHP 24	24	3.0	4.7	7.7	11.5	15.0	21.6	38.3	49.1	56.2	65.0	76.1	98.3	113	140	156
XHP 28	28	3.5	5.5	9.0	13.4	17.6	25.2	44.7	57.3	65.6	75.8	88.7	115	131	163	182
XHP 36	36	4.5	7.1	11.6	17.2	22.6	32.4	57.4	73.7	84.3	97.4	114	148	169	210	233
XHP 45	45	5.6	8.8	14.5	21.5	28.2	40.5	71.8	92.1	105	122	143	184	211	262	292
XHP 52	52	6.5	10.2	16.7	24.8	32.6	46.8	83.0	107	122	141	165	213	244	303	337
XHP 60	60	7.5	11.8	19.3	28.6	37.6	54.0	92.6	115	128	142	162	209	234	283	310
XHP 70	70	8.7	13.7	22.5	33.4	43.9	63.0	108	134	150	166	189	244	273	329	362
XHP 80	80	9.9	15.7	25.8	38.2	50.2	72.0	124	153	171	190	216	278	313	376	414
XHP 90	90	11.2	17.6	29.0	43.0	56.4	81.0	127	154	174	200	243	353	409	501	540
XHP 100	100	12.4	19.6	32.2	47.7	62.7	90.0	142	171	193	222	270	393	454	556	600
XHP 115	115	14.3	22.5	37.0	54.9	72.1	104	163	197	222	256	311	451	522	640	690
XHP 130	130	16.1	25.5	41.9	62.1	81.5	117	184	223	251	289	351	510	590	723	780
XHP 150	150	18.6	29.4	48.3	71.6	94.0	135	212	257	290	333	405	589	681	834	900
XHP 170	170	21.1	33.3	54.8	81.1	107	153	241	291	328	378	459	667	772	946	1020
XHP 190	190	23.6	37.3	61.2	90.7	119	171	269	326	367	422	513	746	863	1060	1140
XHP 220	220	27.3	43.1	70.9	105	138	198	311	377	425	489	594	864	999	1220	1320
XHP 250	250	31.1	49.0	80.5	119	157	225	354	428	483	556	676	981	1140	1390	1500
XHP 280	280	34.8	54.9	90.2	134	176	252	396	480	541	622	757	1100	1270	1560	1680
XHP 300	300	37.3	58.8	96.6	143	188	270	425	514	580	667	811	1180	1360	1670	1800
XHP 320	320	39.8	62.7	103	153	201	288	453	549	618	711	865	1260	1450	1780	1920

Available amperes at +20 °C ± 5 °C / +68 °F ± 9 °F

Final voltage: 1.14 V/cell

XHP type	C ₅ Ah	HOURS				MINUTES								SECONDS		
		8 h	5 h	3 h	2 h	90 min	60 min	30 min	20 min	15 min	10 min	5 min	1 min	30 s	5 s	1 s
XHP 11	11	1.3	2.1	3.4	5.0	6.4	8.6	15.1	18.4	20.8	23.8	27.6	37.3	43.0	53.9	60.1
XHP 16	16	2.0	3.1	4.9	7.2	9.4	12.5	22.0	26.7	30.3	34.6	40.1	54.3	62.5	78.4	87.5
XHP 21	21	2.6	4.1	6.5	9.5	12.3	16.5	28.9	35.1	39.8	45.4	52.6	71.2	82.1	103	115
XHP 24	24	2.9	4.6	7.4	10.9	14.0	18.8	33.0	40.1	45.4	51.9	60.1	81.4	93.8	118	131
XHP 28	28	3.4	5.4	8.6	12.7	16.4	21.9	38.5	46.8	53.0	60.5	70.1	95.0	109	137	153
XHP 36	36	4.4	6.9	11.1	16.3	21.1	28.2	49.5	60.1	68.2	77.8	90.2	122	141	176	197
XHP 45	45	5.5	8.7	13.9	20.4	26.3	35.3	61.9	75.1	85.2	97.3	113	153	176	221	246
XHP 52	52	6.4	10.0	16.0	23.5	30.4	40.7	71.5	86.8	98.5	112	130	176	203	255	284
XHP 60	60	7.4	11.6	18.5	27.1	35.1	47.0	77.7	91.6	101	112	126	172	194	236	260
XHP 70	70	8.6	13.5	21.6	31.7	40.9	54.8	90.7	107	118	131	147	200	227	276	303
XHP 80	80	9.8	15.4	24.7	36.2	46.8	62.7	104	122	134	150	168	229	259	315	346
XHP 90	90	11.0	17.4	27.8	40.7	52.6	70.5	101	119	135	157	192	294	342	422	464
XHP 100	100	12.3	19.3	30.9	45.2	58.5	78.3	112	133	151	175	213	327	380	469	516
XHP 115	115	14.1	22.2	35.5	52.0	67.3	90.1	128	153	173	201	245	376	437	539	593
XHP 130	130	15.9	25.1	40.1	58.8	76.0	102	145	173	196	227	277	425	494	609	670
XHP 150	150	18.4	29.0	46.3	67.9	87.7	118	168	199	226	262	320	490	569	703	774
XHP 170	170	20.8	32.8	52.5	76.9	99.4	133	190	226	256	297	362	555	645	797	877
XHP 190	190	23.3	36.7	58.6	86.0	111	149	212	252	286	332	405	621	721	890	980
XHP 220	220	27.0	42.5	67.9	99.5	129	172	246	292	331	384	469	719	835	1030	1130
XHP 250	250	30.6	48.3	77.2	113	146	196	279	332	376	436	533	817	949	1170	1290
XHP 280	280	34.3	54.1	86.4	127	164	219	313	372	421	489	596	915	1060	1310	1440
XHP 300	300	36.8	57.9	92.6	136	175	235	335	399	451	523	639	980	1140	1410	1550
XHP 320	320	39.2	61.8	98.8	145	187	251	357	425	482	558	682	1050	1210	1500	1650

Data for engine starting applications

Performance for fully charged cells by a constant current charge according to IEC 60623 standard

Available amperes at +20 °C ± 5 °C / +68 °F ± 9 °F

Final voltage: 0.65 V/cell

XHP type	C _s Ah	MINUTES			SECONDS			
		1.5 min	1 min	30 s	15 s	5 s	1 s	
XHP 11	11	149	161	177	185	202	225	
XHP 16	16	217	234	257	270	294	328	
XHP 21	21	285	307	338	354	385	430	
XHP 24	24	325	351	386	404	440	492	
XHP 28	28	380	410	450	472	514	574	
XHP 36	36	488	527	579	607	660	738	
XHP 45	45	610	658	724	758	826	922	
XHP 52	52	705	761	837	876	954	1070	
XHP 60	60	813	878	966	1011	1101	1235	
XHP 70	70	949	1024	1127	1179	1284	1440	
XHP 80	80	1085	1171	1288	1348	1468	1646	
XHP 90	90	1120	1230	1400	1500	1650	1790	
XHP 100	100	1240	1370	1560	1660	1830	1990	
XHP 115	115	1400	1540	1760	1860	2080	2230	
XHP 130	130	1570	1720	1950	2080	2290	2470	
XHP 150	150	1820	1990	2250	2400	2640	2850	
XHP 170	170	2110	2320	2650	2830	3120	3380	
XHP 190	190	2360	2590	2960	3160	3490	3780	
XHP 220	220	2680	2950	3360	3560	3990	4270	
XHP 250	250	3050	3360	3820	4050	4530	4850	
XHP 280	280	3390	3710	4200	4480	4930	5330	
XHP 300	300	3630	3970	4500	4800	5290	5710	
XHP 320	320	3760	4160	4710	4970	5480	5930	

Available amperes at +20 °C ± 5 °C / +68 °F ± 9 °F

Final voltage: 0.85 V/cell

XHP type	C _s Ah	MINUTES			SECONDS			
		3 min	1.5 min	1 min	30 s	15 s	5 s	1 s
XHP 11	11	95.5	107	115	124	133	148	162
XHP 16	16	139	156	167	181	194	215	235
XHP 21	21	182	205	219	237	254	282	309
XHP 24	24	208	234	250	271	291	323	353
XHP 28	28	243	273	292	316	339	376	412
XHP 36	36	313	351	375	407	436	484	530
XHP 45	45	391	439	469	509	545	605	662
XHP 52	52	451	508	541	588	630	699	765
XHP 60	60	520	586	624	678	727	807	883
XHP 70	70	607	684	728	792	848	941	1030
XHP 80	80	694	782	832	905	969	1075	1177
XHP 90	90	709	826	895	997	1090	1210	1290
XHP 100	100	787	917	994	1110	1210	1340	1430
XHP 115	115	885	1040	1120	1250	1370	1510	1600
XHP 130	130	997	1150	1250	1390	1510	1670	1780
XHP 150	150	1150	1330	1440	1600	1740	1930	2050
XHP 170	170	1340	1560	1690	1880	2050	2280	2430
XHP 190	190	1500	1740	1890	2100	2300	2550	2710
XHP 220	220	1690	1980	2140	2390	2620	2890	3060
XHP 250	250	1920	2250	2430	2720	2980	3290	3470
XHP 280	280	2150	2480	2680	3000	3250	3600	3820
XHP 300	300	2300	2660	2870	3210	3480	3857	4100
XHP 320	320	2390	2760	2990	3330	3640	4000	4270



Alcad Sales Offices

United Kingdom

Telephone: +44 1279 772 555

Middle East

Telephone: +357 25 871 816

Facsimile: +357 25 343 542

Asia

Telephone: +65 6 7484 486

Facsimile: +65-6746 6772

USA

Telephone: +1 203 985 2500

Facsimile: +1 203 985 2539

Alcad Limited Headquarters

Sweden

Telephone: +46 491 68 100

Facsimile: +46 491 68 110

Reliability inside

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