

# METROLOGY®

## Leeb Hardness Tester



**LHT-9000DL**

*DL-type impact device, suitable for use in slender narrow slots or in-hole special testing condition*



**LHT-9000D**

*D-type impact device, suitable for general use of conventional testing conditions*

## **LHT**

*Perfect for checking the hardness of metal material*

**LHT-9000D & LHT-9000DL** Leeb hardness tester is a miniature portable hardness tester, it can be simple, lightweight, fast, no damage, high accuracy hardness measurement of the commonly used metal materials, mechanical parts, heavy workpiece etc, Can be used for laboratory, Quality control department, more portable to carry to any environmental of work site to operation.

**LHT-9000D & LHT-9000DL** Fully in meets with ASTM-A956-06 international testing standards, can be widely used in aerospace, automobile and motorcycle industry, mold, machinery manufacturing, metal processing industry, electronics, petroleum and chemical industry and other areas of hardness testing.

## LEEB HARDNESS TESTER



Italy structure  
Research and development design



China Aerospace  
test circuit components



Taiwan mechanism  
manufacture assembly inspection



Taiwan Excellent products  
Diamond Gold Award



impact device

### Features:

### ASTM-A956-06 Standard Test Method For Leeb Hardness Testing of Steel Products

- 1 Intelligent detection** Three button menu simple operation interface, can directly display a variety of test parameters Conditions, status and results.
- 2 Compact and portable** Instrument lightweight, portable, integrated design, without any cable, to enhance the convenience and reliability
- 3 Excellent screen** Industrial high-brightness OLED display, clear and bright font, whether in dark or sunny environment, the screen is still clearly visible
- 4 Accurate measurement** High-precision measurement of circuit components and impact device mechanism to ensure that the test error of  $\pm 0.5\%$ , repeatability of  $0.8\%$  (HLD=800)
- 5 Hardness Parameters** HL HRA HRB HRC HB HS HV
- 6 Large capacity** Can store 300 sets of hardness test data, each storage data included in the number of measurement. the average, test direction, test materials, hardness parameters and other information.
- 7 Testing Materials** Steel, Cast steel, Cwt.steel, Alloy tool steel, Stainless steel, Gc.iron, Nc.iron, Cast aluminum, Copper-zinc, Copper-aluminum, Worught copper, Forged steel, etc.
- 8 Test direction** Can support the test direction of 360 degrees, such as: vertical down, oblique, horizontal, oblique, vertical and other directions can be normal to test
- 9 Testing Range** HL(170-960) HRA(59.1-88) HRB(13.5-101.7) HRC(17.9-69.5) HB(19-683) HS(30.6-102.6) HV(80-1042)
- 10 Test conditions** Maximum hardness 940HV, surface roughness: Ra1.6um, minimum weight:> 5kg (direct test), 2-5kg (need to support solid), 0.05-2kg (need to Vaseline close), the minimum thickness: 5mm ( Need to Vaseline close), the surface hardening layer minimum depth: 0.8mm
- 11 Instrument calibration** Built-in instrument calibration function, with Leeb standard hardness block (optional), to compare the test results.
- 12 Impact ball** Hardness: 1600HV, diameter: 3mm, material: tungsten carbide
- 13 Rechargeable power** Supply USB power socket and built-in rechargeable lithium battery, continuous working time: 20 hours
- 14 Operating environment** Operating temperature: -10 to 50°C, storage temperature: -30 to 60°C, relative humidity:  $\leq 90\%$
- 15 Overall Dimensions** 148\*32\*26mm(L\*W\*T)



Chinese interface



English interface



Optional  
Leeb hardness block HLD-SB



Standard  
Package diagram

The world's most advanced OLED display

## LEEB HARDNESS TESTER (SEPARATE)



Italy structure

Research and development design



China Aerospace  
test circuit components



Taiwan mechanism  
manufacture assembly inspection



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Diamond Gold Award



LHT-9000S



LHT-9000SP

BUILT-IN PRINTER

OLED

### Test principle

In 1978, Swiss Dr. Leeb proposed a brand-new hardness test method. Under the action of elastic force, an impact body of specified quality was used to impact the surface of the sample at a certain speed, and the rebound speed of the punch at 1mm from the surface of the sample. The hardness value is calculated by the ratio of the electromagnetic principle to the impact speed.

Calculated formula as follows:  $HL=1000 \times VB / VA$

HL-Leeb hardness value VB-rebound velocity of impact body VA-impact velocity of impact body

### Test standard

*ASTM-A956-06 Standard Test Method For Leeb Hardness Testing of Steel Products*

Model	LHT-9000S	LHT-9000SP
Screen display	128*64 dot matrix LCD adjustable backlight	128*64 dot matrix high-brightness color OLED
Impact ball head	Φ3mm Material: Tungsten Carbide Hardness 1600HV	
Test accuracy	Indication error ±6HLD Repeatability 6HLD (standard block hardness value 800HLD)	
Testing frequency	MIN > 3 times and calculate the average value as the reference of the test value	
Indentation distance	> 3mm (center distance) > 5mm (center to edge)	
Indentation size	Φ0.54mm D24μm(≥ 300HV)	Φ0.54mm D17μm(≥ 600HV) Φ0.35mm D10μm(≥ 800HV)
Data storage	Built-in Max 600 group	
Printing device	NONE	Built-in printer
Print function	Operation information, number, time, date, impact direction, average number of times, material, test value, average	
Data output	USB 2.0 interface and software	
Software function	Transmission of test results, test value storage management, numerical statistical analysis, test result report (optional accessory)	
Tolerance setting	The upper and lower limits of the hardness value can be set	
Power supply	1.5V battery 200 hours working time	Rechargeable battery 150 hours working time
Environmental requirements	No vibration, no strong magnetic field, no corrosive medium, no serious dust and oil pollution	



**LEEB HARDNESS TESTER (SEPARATE)**



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Diamond Gold Award

*Test standard : ASTM-A956-06 Standard Test Method For Leeb Hardness Testing of Steel Products*

**Scope of application**

Material / Parameter	HLD	HRA	HRB	HRC	HB	HV	HS
Steel, Cast steel	170-960	59.1-85.8	59.6-99.6	17.9-67.9	80-651	83-976	30.1-110.1
Cwt.steel					143-650		
Alloy tool steel,				20.4-67.1		80-898	
Stainless steel			46.5-101.7			85-655	85-802
Gc.iron						93-334	
Nc.iron						131-387	
Cast aluminum			23.8-84.6			19-164	
Copper-zinc			13.5-95.3			40-173	
Copper-aluminum						60-290	
Worught copper						45-315	

**Standard configuration**

LCD display main instrument (LHT-9000S) or OLED display main instrument (LHT-9000SP), test impact device, Leeb hardness standard block, support ring, nylon brush, USB cable, battery or charger, instrument carrying case



**LHT-9000S**



**LHT-9000SP**

**Test diagram**



## LEEB hardness conversion table (D-type impact device)

**Material: carbon steel, low alloy steel, cast steel**  
**\*HB(1): rolled steel material \*HB(2): forged material**

HLD	HRC	HRB	HV	HB1	HB2	HSD	HLD	HRC	HRB	HV	HB1	HB2	HSD
300			83				396		74.0	129			
302			84				398		74.5	130			
304			85				400		75.0	131			142
306			85				402		75.5	133			144
308			86				404		76.0	134			145
310			87				406		76.5	135			147
312			87				408		77.0	136			149
314			88				410		77.5	138			150
316			89				412		78.0	139			152
318			90				414		78.4	141			153
320			90				416		78.9	142			155
322			91				418		79.3	143			156
324			92				420		79.8	145	140		157
326			93				422		80.2	146	141		159
328			94				424		80.7	148	143		160
330			94				426		81.1	149	144		162
332			95				428		81.5	151	145		163
334			96				430		81.9	152	147		165
336			97				432		82.4	154	148		166
338			98				434		82.8	155	150		168
340			99				436		83.2	157	151		169
342			100				438		83.6	158	153		171
344			101				440		84.0	160	154		172
346			101				442		84.4	161	156		174
348			102				444		84.8	163	157		175
350		59.6	103				446		85.1	164	159		176
352		60.3	104				448		85.5	166	160		178
354		61.0	105				450		85.9	168	162		179
356		61.7	106				452		86.3	169	164		181
358		62.4	107				454		86.6	171	165		182
360		63.1	108				456		87.0	173	167		184
362		63.8	109				458		87.4	174	168		185
364		64.5	110				460		87.7	176	170	187	26.4
366		65.1	111				462		88.1	178	172	188	26.7
368		65.8	112				464		88.5	179	173	190	27.0
370		66.4	114				466		88.8	181	175	191	27.3
372		67.0	115				468		89.2	183	177	193	27.6
374		67.7	116				470		89.5	185	178	194	27.9
376		68.3	117				472		89.9	186	180	196	28.2
378		68.9	118				474		90.3	188	182	197	28.5
380		69.5	119				476		90.6	190	184	198	28.8
382		70.1	120				478		91.0	192	185	200	29.1
384		70.6	121				480		91.3	194	187	202	29.4
386		71.2	123				482		91.7	195	189	203	29.7
388		71.8	124				484		92.1	197	191	205	30.0
390		72.3	125				486		92.4	199	192	206	30.3
392		72.9	126				488		92.8	201	194	208	30.6
394		73.4	127				490		93.1	203	196	209	30.9

*Test standard : ASTM-A956-06 Standard Test Method For Leeb Hardness Testing of Steel Products*

## LEEB hardness conversion table (D-type impact device)

**Material: carbon steel, low alloy steel, cast steel**  
**\*HB(1): rolled steel material \*HB(2): forged material**

HLD	HRC	HRB	HV	HB1	HB2	HSD	HLD	HRC	HRB	HV	HB1	HB2	HSD
492		93.5	205	198	211	31.2	588	32.7		312	303	304	45.0
494		93.9	207	200	212	31.5	590	33.0		315	306	308	45.4
496		94.3	209	202	214	31.7	592	33.3		317	308	310	45.7
498		94.6	211	204	215	32.0	594	33.6		320	311	313	46.0
500		95.0	213	205	217	32.2	596	33.9		322	314	315	46.3
502		95.4	215	207	219	32.5	598	34.2		325	316	318	46.6
504		95.8	217	209	220	32.8	600	34.5		328	319	320	46.9
506		96.2	219	211	222	33.1	602	34.8		330	322	323	47.2
508		96.6	221	213	224	33.3	604	35.1		333	324	325	47.5
510	19.8	97.0	223	215	225	33.6	606	35.4		336	327	328	47.8
512	20.2	97.4	225	217	227	33.9	608	35.7		338	330	331	48.2
514	20.6	97.9	227	219	229	34.2	610	35.9		341	332	333	48.5
516	21.0	98.3	229	221	230	34.4	612	36.2		344	335	336	48.8
518	21.3	98.7	231	223	232	34.7	614	36.5		346	338	339	49.1
520	21.7	99.2	233	225	234	35.0	616	36.8		349	340	341	49.4
522	22.0	99.6	235	227	235	35.3	618	37.1		352	343	344	49.7
524	22.4		237	229	237	35.6	620	37.4		355	346	346	50.1
526	22.8		239	231	239	35.8	622	37.6		357	349	349	50.4
528	23.1		241	234	241	36.1	624	37.9		360	351	352	50.7
530	23.5		244	236	242	36.4	626	38.2		363	354	355	51.0
532	23.8		246	238	244	36.7	628	38.5		366	357	357	51.3
534	24.1		248	240	246	37.0	630	38.7		369	360	360	51.7
536	24.5		250	242	248	37.3	632	39.0		372	363	363	52.0
538	24.8		252	244	250	37.6	634	39.3		375	366	366	52.3
540	25.2		255	246	252	37.9	636	39.6		377	369	369	52.6
542	25.5		257	249	254	38.1	638	39.8		380	371	371	52.9
544	25.8		259	251	256	38.4	640	40.1		383	374	374	53.3
546	26.2		261	253	258	38.7	642	40.4		386	377	377	53.6
548	26.5		264	255	259	39.0	644	40.7		389	380	380	53.9
550	26.8		266	258	261	39.3	646	40.9		392	383	383	54.2
552	27.1		268	260	263	39.6	648	41.2		395	386	386	54.6
554	27.5		270	262	265	39.9	650	41.5		398	389	389	54.9
556	27.8		273	265	268	40.2	652	41.7		401	392	392	55.2
558	28.1		275	267	270	40.5	654	42.0		404	395	395	55.6
560	28.4		278	269	272	40.8	656	42.3		407	398	398	55.8
562	28.8		280	272	274	41.1	658	42.6		411	401	401	56.2
564	29.1		282	274	276	41.4	660	42.8		414	404	404	56.5
566	29.4		285	276	278	41.7	662	43.1		417	407	407	56.9
568	29.7		287	279	280	42.0	664	43.4		420	410	410	57.2
570	30.0		290	281	282	42.3	666	43.6		423	413	413	57.5
572	30.3		292	283	285	42.6	668	43.9		426	417	417	57.9
574	30.6		294	286	287	42.9	670	44.1		429	420	420	58.2
576	30.9		297	288	289	43.2	672	44.4		433	423	423	58.5
578	31.2		299	291	292	43.5	674	44.7		436	426	426	58.9
580	31.5		302	293	294	43.8	676	44.9		439	429	429	59.2
582	31.8		304	296	296	44.1	678	45.2		442	432	432	59.5
584	32.1		307	298	299	44.4	680	45.5		446	435	435	59.9
586	32.4		309	301	301	44.7	682	45.7		449	439	439	60.2

*Test standard : ASTM-A956-06 Standard Test Method For Leeb Hardness Testing of Steel Products*



## LEEB hardness conversion table (D-type impact device)

**Material: carbon steel, low alloy steel, cast steel**  
**\*HB(1): rolled steel material \*HB(2): forged material**

HLD	HRC	HRB	HV	HB1	HB2	HSD	HLD	HRC	HRB	HV	HB1	HB2	HSD
684	46.0		452	442	442	60.5	788	58.8		662	624	624	79.3
686	46.2		456	445	445	60.9	790	59.0		666	628	628	79.7
688	46.5		459	448	448	61.2	792	59.2		671	632	632	80.1
690	46.8		463	451	451	61.6	794	59.5		676	635	635	80.5
692	47.0		466	455	455	61.9	796	59.7		681	639	639	80.9
694	47.3		469	458	458	62.2	798	59.9		686	643	643	81.2
696	47.5		473	461	461	62.6	800	60.1		691	647	647	81.6
698	47.8		476	465	465	62.9	802	60.4		697	651	651	82.0
700	48.0		480	468	468	63.3	804	60.6		702			82.4
702	48.3		483	471	471	63.6	806	60.8		707			82.8
704	48.6		487	474	474	64.0	808	61.0		712			83.2
706	48.8		491	478	478	64.3	810	61.2		718			83.7
708	49.1		494	481	481	64.6	812	61.4		723			84.1
710	49.3		498	485	485	65.0	814	61.7		728			84.5
712	49.6		501	488	488	65.3	816	61.9		734			84.9
714	49.8		505	491	491	65.7	818	62.1		739			85.3
716	50.1		509	495	495	66.0	820	62.3		745			85.7
718	50.3		513	498	498	66.4	822	62.5		750			86.1
720	50.6		516	502	502	66.7	824	62.7		756			86.5
722	50.8		520	505	505	67.1	826	62.9		762			87.0
724	51.1		524	508	508	67.4	828	63.1		768			87.4
726	51.3		528	512	512	67.8	830	63.3		773			87.8
728	51.6		532	515	515	68.2	832	63.5		779			88.2
730	51.8		535	519	519	68.5	834	63.7		785			88.6
732	52.1		539	522	522	68.9	836	63.9		791			89.1
734	52.3		543	526	526	69.2	838	64.1		797			89.5
736	52.6		547	529	529	69.6	840	64.3		803			89.9
738	52.8		551	533	533	69.9	842	64.5		809			90.4
740	53.1		555	536	536	70.3	844	64.7		816			90.8
742	53.3		559	540	540	70.7	846	64.9		822			91.2
744	53.6		563	543	543	71.0	848	65.1		828			91.7
746	53.8		568	547	547	71.4	850	65.3		835			92.1
748	54.1		572	551	551	71.8	852	65.4		841			92.6
750	54.3		576	554	554	72.1	854	65.6		848			93.0
752	54.5		580	558	558	72.5	856	65.8		854			93.5
754	54.8		584	561	561	72.9	858	66.0		861			93.9
756	55.0		589	565	565	73.2	860	66.2		867			94.4
758	55.3		593	569	569	73.6	862	66.3		874			94.8
760	55.5		597	572	572	74.0	864	66.5		881			95.3
762	55.7		602	576	576	74.3	866	66.7		888			95.7
764	56.0		606	580	580	74.7	868	66.8		895			96.2
766	56.2		610	583	583	75.1	870	67.0		902			96.7
768	56.5		615	587	587	75.5	872	67.2		909			97.1
770	56.7		619	591	591	75.8	874	67.3		916			97.6
772	56.9		624	594	594	76.2	876	67.5		923			98.1
774	57.2		628	598	598	76.6	878	67.6		931			98.6
776	57.4		633	602	602	77.0	880	67.8		938			99.0
778	57.6		638	605	605	77.4	882	68.0		946			99.5
780	57.9		642	609	609	77.7	884	68.1		953			
782	58.1		647	613	613	78.1	886	68.2		961			
784	58.3		652	617	617	78.5	888	68.4		968			
786	58.6		657	620	620	78.9	890	68.5		976			

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