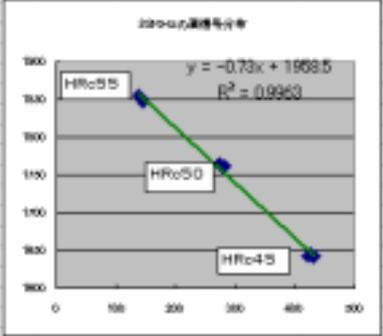


## 試験周波数32 KHzで測定した場合のHRC 45, 50, 55の検量線

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U				
1	標準片																								
2	硬さ基準片の渦信号強度データ(山本科学工具研究社)																								
2	HRC45	250	He	690	-1250	500	He	765	-2521	1,000	He	-252	-439	4,000	He	-5152	-3038	8,000	He	-5161	129	32,000	He	-422	1542
3	HRC45	250	He	695	-1246	500	He	765	-2523	1,000	He	-249	-4349	4,000	He	-5148	-3042	8,000	He	-5160	120	32,000	He	-425	1547
4	HRC45	250	He	693	-1246	500	He	763	-2518	1,000	He	-252	-4338	4,000	He	-5130	-3020	8,000	He	-5136	134	32,000	He	-431	1540
5	HRC45	250	He	693	-1246	500	He	762	-2513	1,000	He	-249	-4329	4,000	He	-5124	-3024	8,000	He	-5136	130	32,000	He	-433	1542
6	HRC45	250	He	694	-1246	500	He	763	-2521	1,000	He	-251	-4342	4,000	He	-5122	-3022	8,000	He	-5141	121	32,000	He	-429	1542
7	HRC50	250	He	710	-1253	500	He	799	-2546	1,000	He	-194	-4419	4,000	He	-5207	-3266	8,000	He	-5254	-76	32,000	He	-280	1701
8	HRC50	250	He	708	-1252	500	He	795	-2528	1,000	He	-192	-4413	4,000	He	-5198	-3256	8,000	He	-5232	-77	32,000	He	-283	1702
9	HRC50	250	He	708	-1250	500	He	799	-2537	1,000	He	-190	-4410	4,000	He	-5195	-3270	8,000	He	-5292	-64	32,000	He	-277	1701
10	HRC50	250	He	710	-1253	500	He	799	-2546	1,000	He	-190	-4419	4,000	He	-5207	-3278	8,000	He	-5265	-66	32,000	He	-274	1705
11	HRC50	250	He	710	-1252	500	He	799	-2544	1,000	He	-192	-4413	4,000	He	-5198	-3267	8,000	He	-5232	-78	32,000	He	-279	1700
12	HRC55	250	He	721	-1256	500	He	823	-2559	1,000	He	-145	-4475	4,000	He	-5248	-3457	8,000	He	-5312	-53	32,000	He	-145	1840
13	HRC55	250	He	721	-1257	500	He	824	-2561	1,000	He	-145	-4478	4,000	He	-5254	-3462	8,000	He	-5300	-55	32,000	He	-144	1832
14	HRC55	250	He	721	-1256	500	He	824	-2558	1,000	He	-141	-4475	4,000	He	-5246	-3459	8,000	He	-5323	-59	32,000	He	-137	1835
15	HRC55	250	He	721	-1257	500	He	824	-2561	1,000	He	-145	-4478	4,000	He	-5256	-3462	8,000	He	-5320	-55	32,000	He	-144	1831
16	HRC55	250	He	719	-1253	500	He	822	-2553	1,000	He	-144	-4463	4,000	He	-5226	-3451	8,000	He	-5320	-55	32,000	He	-145	1847



プローブ型コイル(φ15)と標準片



25000の渦信号強度

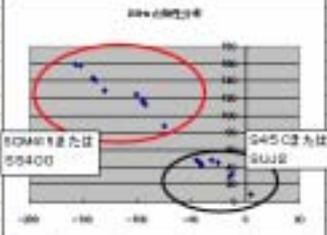
$y = -0.73x + 19585$   
 $R^2 = 0.9963$

標準片は母材(SM4)の焼き戻し温度を変化(結晶・粒径)させて、硬さを管理、高い硬度値は高周波を抽出、硬さと信号強度に強い相関がある。

ロックウエルの硬度で2目盛りは、明瞭に判別が可能。

## 異材判別(S45C, SUJ2, SCM415, SS400)の渦信号強度の分布データ

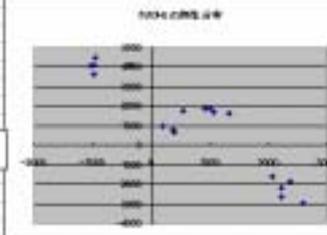
材料名	25kHz		50kHz		100kHz		200kHz		400kHz		800kHz		1600kHz		
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	
S45C	-42	45	-48	187	-71	505	274	791	973	222	685	-468	261	-513	345
S45C	-45	45	-51	159	-43	469	297	874	798	159	544	-481	157	-505	317
S45C	-45	45	-114	125	-151	848	202	1205	927	842	1188	173	821	-560	576
SUJ2	-15	30	93	139	245	-61	2217	-2150	-2613	-8199	-4714	-5645	-8250	-1773	-5480
SUJ2	-18	49	83	187	267	190	2265	-1573	80	-8965	-4828	-6238	-8931	-2021	-2884
SUJ2	-13	32	130	128	1210	-155	2985	-2874	-1462	-3343	-5188	-6784	-8447	-1228	-2846
SUJ2	8	9	147	82	1991	-330	2210	-2832	-265	-8759	-5318	-6275	-8942	-1657	-2888
SUJ2	-27	49	42	184	395	144	2085	-1894	-71	-8117	-2947	-6882	-4319	-1488	-1832
SCM415	-157	150	-446	554	-1102	1730	-265	4465	2238	3156	7099	5875	3614	175	4027
SCM415	-120	129	-268	442	-279	1225	-262	3959	1683	8240	6085	5947	8995	258	3782
SCM415	-183	158	-420	586	-823	1889	-263	4894	2718	8487	8670	3987	8127	-788	2879
SCM415	-146	144	-268	483	-1046	1480	-265	4107	2188	6715	5915	4842	8920	-570	3212
SCM415	-128	140	-258	472	-1025	1470	-1025	4122	2187	8245	6788	4814	8247	-225	3381
SS400	-65	116	-215	414	-150	1182	985	1872	2344	141	1079	-1829	-812	-1271	-486
SS400	-65	119	-207	427	-64	1187	1073	1709	2218	-91	812	-1883	-920	-1263	-479
SS400	-107	125	-211	489	-6	1249	1232	1816	2719	-851	288	-1425	-1481	-1261	-729
SS400	-75	89	-131	311	-220	822	548	1749	2048	750	1562	-1120	-236	-1446	-218
SS400	-82	119	-212	405	-170	1182	918	1887	2228	233	1188	-1887	-884	-1284	-288



25kHzの渦信号強度

SCM415またはSS400

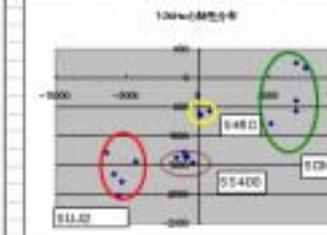
SUJ2



50kHzの渦信号強度

S45C

SUJ2



1600kHzの渦信号強度

SUJ2

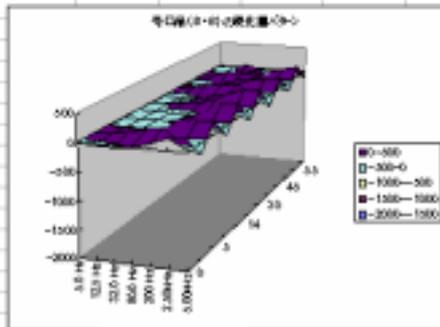
S45C

SS400

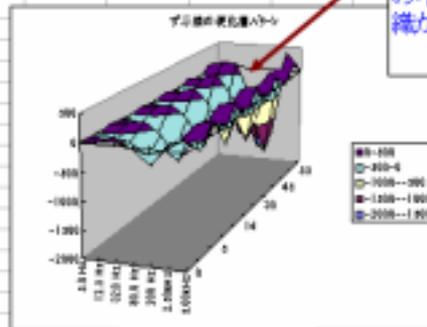
SCM415

低い試験周波数では判別が2種類にしかできない。しかし、高い試験周波数の場合は明瞭に4つの鋼材に判別ができる。

熱処理結果の渦信号強度による3D表示



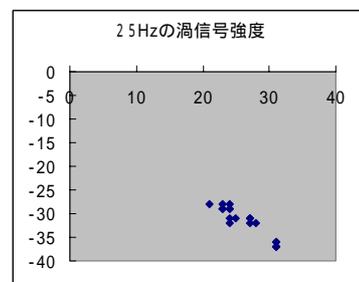
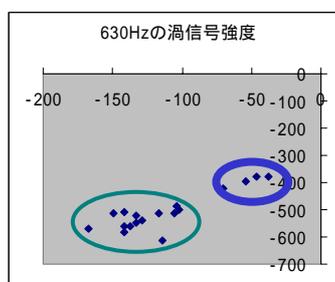
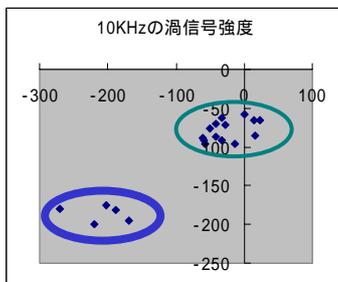
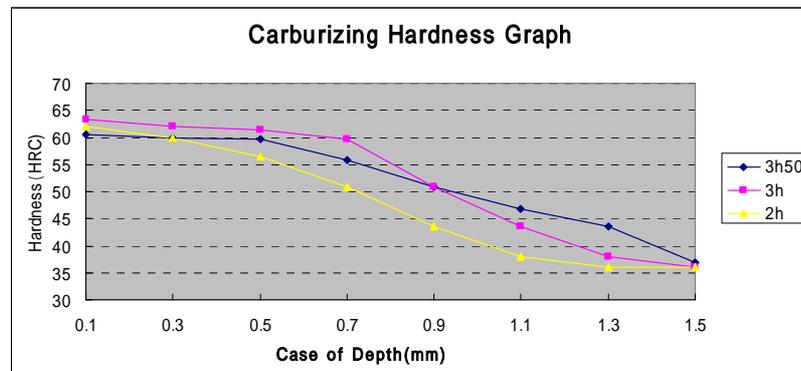
良品



欠陥品

表面近傍の硬化層に電導率・透磁率の不連続(谷)な組織が存在する。

浸炭されたギアの硬度分布曲線と渦信号強度データの分布



高い試験周波数(10KHz)の分布は、表面からの炭素濃度の違いによる硬さを示す。

低い試験周波数(25Hz)の分布は、深さ1.5mm以下の組織状態が均一であることを示す。