[Table 1]

(% by mass)

Steel	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	Nb	V	Ti	Al	N	Ca	O	Ceq	Ceq*	ACR	Ti/N	Remarks
A	0.071	0.13	1.65	0.01	0.0015	0.20	0.30	—	—	0.012	—	0.008	0.023	0.0045	0.0018	0.0023	0.379	2.65	0.452	1.8	Example of invention
B	0.103	0.07	1.25	0.01	0.0012	—	—	—	—	0.026	0.03	0.011	0.042	0.0034	0.0023	0.0030	0.318	2.74	0.575	3.2	Example of invention
C	0.110	0.12	0.85	0.01	0.0015	0.35	0.35	0.22	—	0.025	0.04	0.013	0.035	0.0045	0.0022	0.0025	0.337	2.44	0.552	2.9	Example of invention
D	0.082	0.15	1.55	0	0.0019	—	—	—	—	0.024	—	0.012	0.033	0.0044	0.0018	0.0035	0.340	2.87	0.148	2.7	Example of invention
E	0.049	0.18	1.52	0.01	0.0018	0.22	0.65	0.25	—	0.023	—	0.017	0.035	0.0055	0.0022	0.0029	0.410	2.86	0.377	3.1	Example of invention
F	0.085	0.12	1.42	0.01	0.0016	—	0.54	0.30	—	0.024	—	0.012	0.032	0.0044	0.0020	0.0024	0.388	2.85	0.472	2.7	Example of invention
G	0.078	0.20	1.58	0.01	0.0020	0.15	0.40	—	0.15	0.018	—	0.011	0.030	0.0040	0.0026	0.0030	0.408	2.88	0.418	2.8	Example of invention
H	0.093	0.26	1.64	0.01	0.0022	—	0.15	—	0.10	0.028	—	0.009	0.033	0.0043	0.0020	0.0020	0.396	3.22	0.407	2.1	Comparative Example
I	0.112	0.25	1.44	0.01	0.0020	—	—	—	—	0.025	—	0.010	0.032	0.0039	0.0016	0.0032	0.352	3.02	0.143	2.6	Comparative Example
J	0.023	0.23	1.76	0.01	0.0018	0.40	0.30	0.20	—	0.011	—	0.013	0.035	0.0045	0.0020	0.0022	0.403	2.60	0.459	2.9	Comparative Example
K	0.053	0.20	1.66	0.01	0.0012	0.35	0.40	—	—	0.015	0.02	0.011	0.033	0.0039	0.0028	0.0011	0.384	2.71	1.468	2.8	Comparative Example
L	0.082	0.20	1.42	0.01	0.0029	0.20	0.04	—	—	0.015	—	0.011	0.032	0.0040	0.0011	0.0038	0.335	2.54	-0.035	2.8	Comparative Example
M	0.110	0.13	0.44	0.01	0.0023	0.30	0.55	0.32	0.15	0.025	0.04	0.011	0.025	0.0041	0.0025	0.0022	0.342	2.16	0.483	2.7	Comparative Example
N	0.110	0.25	1.75	0.01	0.0063	—	—	—	—	0.020	—	0.010	0.026	0.0038	0.0027	0.0022	0.402	3.07	0.195	2.6	Comparative Example
O	0.134	0.26	1.70	0.01	0.0022	—	—	0.28	—	0.015	0.05	0.013	0.029	0.0045	0.0019	0.0018	0.482	2.95	0.411	2.9	Comparative Example
P	0.072	0.15	1.43	0.01	0.0018	0.33	0.50	0.20	—	0.008	—	0.011	0.025	0.0035	0.0020	0.0030	0.406	2.31	0.302	3.1	Comparative Example
Q	0.070	0.20	1.61	0.01	0.0015	0.20	0.80	0.18	0.10	0.033	—	0.012	0.026	0.0028	0.0023	0.0022	0.461	3.30	0.665	4.3	Comparative Example
R	0.065	0.16	1.62	0.01	0.0018	0.32	0.35	0.25	—	0.025	—	0.015	0.025	0.0041	0.0020	0.0018	0.430	3.00	0.537	3.7	Comparative Example
S	0.074	0.28	1.65	0.01	0.0022	—	—	—	—	0.025	—	0.008	0.026	0.0060	0.0020	0.0020	0.349	3.01	0.407	1.3	Comparative Example
T	0.040	0.22	2.15	0.01	0.0020	—	0.20	—	—	0.012	—	0.011	0.033	0.0037	0.0022	0.0022	0.412	2.99	0.470	3.0	Comparative Example
U	0.105	0.42	1.55	0.01	0.0022	—	—	0.21	0.20	0.022	—	0.016	0.030	0.0054	0.0015	0.0011	0.445	3.04	0.395	3.0	Comparative Example
V	0.110	0.25	1.42	0.01	0.0020	0.25	—	0.26	—	0.025	0.04	0.026	0.032	0.0058	0.0020	0.0023	0.424	2.94	0.395	4.5	Comparative Example
W	0.116	0.25	1.41	0.01	0.0018	0.25	—	0.26	—	0.025	0.04	0.019	0.026	0.0071	0.0022	0.0025	0.428	2.95	0.460	2.7	Comparative Example

Note 1: Underlined portions are out of the ranges of the present invention.

Note 2: ACR=([Ca]−(0.18+130*[Ca])*[O])/1.25*[S], [M] is the content of element M (% by mass).

Note 3: Ceq=[C]+[Mn]/6+[Cu]/15+[Ni]/15+[Cr]/5+[Mo]/5+[V]/5, [M] is the content of element M (% by mass).

Note 4: $Ceq^{*}=5.5[C]^{4/3}+15[P]+0.90[Mn]+0.12[Ni]+7.9[Nb]^{1/2}+0.53[Mo]$, [M] is the content of element M (% by mass).

Table 1

(% by mass)

Steel	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	Nb	V	Ti	Al	N	Ca	O	Ceq	Ceq*	ACR	Ti/N	Remarks
A	0.071	0.13	1.65	0.007	0.0015	0.20	0.30	—	—	0.012	—	0.008	0.023	0.0045	0.0018	0.0023	0.379	2.65	0.452	1.8	Example of invention
B	0.103	0.07	1.25	0.005	0.0012	—	—	—	—	0.026	0.03	0.011	0.042	0.0034	0.0023	0.0030	0.318	2.74	0.575	3.2	Example of invention
C	0.110	0.12	0.85	0.006	0.0015	0.35	0.35	0.22	—	0.025	0.04	0.013	0.035	0.0045	0.0022	0.0025	0.337	2.44	0.552	2.9	Example of invention
D	0.082	0.15	1.55	0.004	0.0019	—	—	—	—	0.024	—	0.012	0.033	0.0044	0.0018	0.0035	0.340	2.87	0.148	2.7	Example of invention
E	0.049	0.18	1.52	0.008	0.0018	0.22	0.65	0.25	—	0.023	—	0.017	0.035	0.0055	0.0022	0.0029	0.410	2.86	0.377	3.1	Example of invention
F	0.085	0.12	1.42	0.005	0.0016	—	0.54	0.30	—	0.024	—	0.012	0.032	0.0044	0.0020	0.0024	0.388	2.85	0.472	2.7	Example of invention
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I	0.112	0.25	1.44	0.012	0.0020	—	—	—	—	0.025	—	0.010	0.032	0.0039	0.0016	0.0032	0.352	3.02	0.143	2.6	Comparative Example
J	0.023	0.23	1.76	0.008	0.0018	0.40	0.30	0.20	—	0.011	—	0.013	0.035	0.0045	0.0020	0.0022	0.403	2.60	0.459	2.9	Comparative Example
K	0.053	0.20	1.66	0.006	0.0012	0.35	0.40	—	—	0.015	0.02	0.011	0.033	0.0039	0.0028	0.0011	0.384	2.71	1.468	2.8	Comparative Example
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M	0.110	0.13	0.44	0.005	0.0023	0.30	0.55	0.32	0.15	0.025	0.04	0.011	0.025	0.0041	0.0025	0.0022	0.342	2.16	0.483	2.7	Comparative Example
N	0.110	0.25	1.75	0.006	0.0063	—	—	—	—	0.020	—	0.010	0.026	0.0038	0.0027	0.0022	0.402	3.07	0.195	2.6	Comparative Example
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