Order NO	Material	Condition	Microstructure	Descriptions	Observation Magnification
Group 1: the equilibrium microstructure of the iron-carbon system (9 types)					
1	Armco iron	Annealed	Ferrite	The white equiaxial polygonal grain is ferrite and the dark lines are grain boundaries.	200
2	No 20 Steel	Annealed	Low-carbon steel equilibrium microstructure	The white grain is ferrite and dark massive is pearlite and under a high-powered microscope, it appears the lamellar pearlite.	200
3	No 45 Steel	Annealed	Medium carbon steel equilibrium microstructure	Diddo, but the pearlite structure increases	500
4	No 65 Steel	Annealed	High-carbon steel equilibrium microstructure	The majority dark structure is pearlite and white one is ferrite. Somes specimens are No 70 steel.	500
5	T8 Steel	Annealed	Eutectoid steel equilibrium microstructure	The basic structure is lamellar pearlite and it is the eutectoid structure of Fe and cementite.	500
6	T12 Steel	Annealed	Hypereutectoid steel equilibrium microstructure	The basic structure is lamellar pearliteand it is the eutectoid structure of Fe and cementite.	500
7	Hypoeutectic white Cast iron	As-cast	Ledeburite + pearlite	The matrix structure is black/white alternative distribution modified ledeburite and black dendrite one is the pearlite turned	500

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				by austenite.	
8	Eutectic white Iron	As-cast	Ledeburite	The white structure is cementite (including eutectic cementite and proeutectoid cementite).The black rounded grain and banded structure is pearlite.	500
9	Hypereutectic white iron	As-cast	Ledeburite+cementite	The matrix structure is black/white alternative distribution modified proeutectic cementite.proeutectic cementite.	500
Group 2: heat treatment of steel microstructure (14 types)					
10	T8 Steel	Normalized	Sorbite	Sorbite is finer size pearlite with short layer distance.	500
11	T8 Steel	Quick cooling normalized	Troostite	Troostite is very fine size pearlite. It is difficult to identify its lamellar structure under the microscope. The grey-white lump-shaped is troostite,the needled-shaped is quenched martensite.	500
12	65Mn	Austempering	Upper bainite	These feather-shaped are upper bainite which are based on structure of sorbite,quenched martensite and retained austenite.	100
13	65Mn	Austempering	Lower bainite	The black needle like structure is lower bainite and the white basic structure is quenched martensite and retained austenite. Some specimens are T8 steel.	500
14	No 20 Steel	Quenched	Low carbon martensite	The bunches of strip structure is low carbon martensite.	500
15	T12Steel	Quenched	High carbon martensite	The dark needle-shaped structure is high carbon martensite and the white one is retained austenite.	500
16	45Steel	Quenched	Medium carbon martensite	The black edgewise structures at a 120 degree angle are needle-shaped martensite and others are called lath martensite.	500
17	T10Steel	Spheroidizing annealed	Spheroidite	The basic structure is ferriteand the white grain size is cementite.	500
18	GCr15	Quenched and tempered	Tempered troostite	It appears in black dotted shape and the granular one is carbide, others are supersaturated carbon ferrite.	400
19	GCr15	Quenched and tempered	Tempered sorbite	The granular structure is carbide other ferrite.	400
20	T12Steel	Normalized	Normalized microstructure	The white needle-shaped with little reticulate distribution structure is cementite and others are lamellar-structure pearlites.	400

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21	No 15 Steel	Annealed after being carburized	Carburized microstructure	The surface layer is hypereutectoid structure (reticulate cementite+ pearlite), from shallow to deeper,the more the ferrie are , the less the carbon content is. (Some specimens are No 20 steel).	50
22	No 45 Steel	Boronizing	Boronizing microstructure	The surface layer is boride layer in serrate shape and transition layer. The cored part is steel matrix structure.	50
23	40Cr	Soft-nitrided	Soft-nitriding microstructure	The surface layer is bright white nitrogen compound and diffusion layer with nitrogen. The cored part is 40Cr matrix structure.	500
Group 3 Alloy steel (5types)					
24	High-speed steel	As-cast	Eutectic ledeburite+troostite+martensite	The skeletal-shaped structure is eutectic ledeburite,the basic structure is black troostite and the white blocks are sartensite and retained austenite.	500
25	High-speed steel	Quenched	Martensite+retained austenite+carbide	The big grain size is eutectic carbide and small grain size is proeutectoid carbide,others are martensite and retained austenite.	450
26	High-speed steel	Quenched and tempered	Tempered martensite+carbide	The black basic structure is quenched martensite and white grain size is carbide.	400
27	High-speed steel	Annealed	Spheroidal pearlite	The white spheroidal structure is carbide and the basic structure is pearlite.	500
28	Stainless steel	Solution treatment	Austenite	Some of the austenitegrains have twin planes.	500
Group 4: other steel microstructure (6types)					
29	No 20 Steel	As-cast condition	Low-carbon cast steel microstructure	the white net-shaped,needle-shaped,and massive structures are ferrite and the black part is pearlite.	200
30	T8 Steel	Decarburizing	Surface decarburization microstructure	The furnace is decarburized and to be hyposteel. The black is pearlite, white is ferrite and the cored part is coarse-lamellar pearlite.	100
31	No 45 Steel	Annealed after forning	Banded structure	The white crystal is ferrite and the black strip-shaped is pearlite.	100
32	Iron-base porous bearings	Powder metallurgy	Pearlite+ ferrite+porous oil holes	The black strip-shaped is pearlite, the white massive part is ferrite and the sporadic dark sports are porous oil holes	400
47	T12 Steel	Overburned	Pearlite+carbide	Heat the specimen and it appears coarsing of the grain size. The grain boundary is oxidized and some boundary forms cracks.	100
46	No 45 Steel	Low carbon electrode arc welding rod	Widmanstaten structure + sorbite or pearlite+ferrite	The columnar crystal structure is weld zone. The Widmanstatten structure is super-heat zone and others are	100

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				sorbite,pearlite and ferrite.	
Group 5: Various cast iron microstructure (7types)					
33	Grey cast iron	As cast condition	Lamina graphite	The black lamellar structure is graphite and the matrix structure is uncorroded.	200
34	Malleable cast iron	Malleablizing	Flocculent-shape graphite	The flocculent black structure is graphite and the matrix structure is uncorroded.	200
35	Ductile Iron	Annealed	Spheroidal graphite+ferrite	the white Crstatl is frrite and the inky sphericity is graphite	200
36	Ductile Iron	Low temperature normalized	Spheroidal graphite+ferrite+pearlite	The white crystal is ferrite, lamellar structure is pearlite and the black sphericity is graphite.	400
49	Ductile Iron	As cast condition	Spheroidal graphite+pearlite+ferrite	The white crystal is ferrite, lamellar structure is pearlite and the black sphericity is graphite.	400
37	Ductile Iron	Normalized	Spheroidal graphite+pearlite	lamellar structure is pearlite and the gray golbular is graphite.	400
48	High phosphorous cast iron	Casted	Pearlite+Graphite and phosphorus eutectic	The fingerprint-like structure is pearlite and the black coarse strip is graphit. The white graniphyric structure with black spots is phosphorus compound eutecticum.	200
Group 6:non-ferrous alloy microstructure (9types)					
38	Cast aluminium	Unmetamorphosed	Primary silicon grains+eutecticum	The shallow polygon grain size is primary silicon and others are white solid solution and grey needle-like silicon eutectic structure.	250
39	Cast aluminium	Modification treatment	Primary crystal α solid solution+eutecticum	The white dendritic or granular The white dendritic or granular the gray needle-like is silicon eutectic structure.	250
40	H68 brass	Annealed	Single-phase of brass	It is a phase and some grain has annealing twin inside.	200
41	H62brass	As cast	Dual-phase brass microstructure	The white structure is a phase and the black one is β phase (CUZU base solid solution)	200
42	Tin bronze	As cast	α-phase+δ-phase	The black dendritic crystallographic axis is Cu-rich solid solution (a phase)and white one is Tin-rich solid solution (δphase)	250
50	Albronze	As cast	α-phase+eutectoid+FeAl3	The white structure is a phase, the dead color structure in the grain boundary is eutectoid (a+y2) and the inside grain	200
43	Lead-base bearing alloy	As cast	Primary crystal β solid solution+eutecticum（α+β）+Cu-Sn compounds	The white block is primary β solid solution and black matrix structure is eutecticum (a+β) . The white needle-shaped and granular structure is Cu-Sn compound (CU2Sb)	200

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44	Tin-base bearing alloy	As cast	A-phase+β-phase+ε-phase	The black matrix structure is solid solution and the white needle-like and granular are ε phase (Cu6Sn5) . The white blocks are β phase (SnSb)	250
45	Zinc-base alloy	Casted	Primary crystal α+ eutecticum	The matrix structure is ZN,and the black coarse block is primary a solid solution.The dendtritic structure is eutecticum	100
Remark: you can choose 25pcs to be one set.					

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