RUDOLF MEDICAL is a manufacturer of high-quality surgical instruments, using German Stainless Steel in accordance to the International Standard ISO 7153-1: 2016-10* Surgical instruments - Materials - Part 1: Metals*, you can find the main extracts below in this document.

(…)

Stainless steel

1. Scope

This part of ISO 7153-1 contains a survey and a selection of stainless steels available for use in the manufacture of surgical, dental and specific Instruments for orthopaedic surgery.

(…)

2. Normative references

The following Standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 7153-1. At the time of publication, the editions indicated were valid. All Standards are subject to revision, and parties to agreements based on this part of ISO 7153-1 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

DIN EN 10088-1: 2014, *Stainless steels - List of stainless steels*

DIN 96298-3:2017-10 Medical instruments – Terms, measuring methods and tests – Part 3: Tests

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Location: Moldova

Table 1 — Steel grades

Reference letter of steel grade (see table2)	**cutting instruments** **Examples**	**Preferably used for non-cutting instruments** **Examples**	**fitting parts and other assemblies** **Examples**	DIN EN 10088-1	NR. DIN EN 10088-1
A		tissue forceps, dresslng forceps, retractors, probes, dental tweezers	rivets, solid handles, guide pins, screws, nuts	X12Cr13 X12CrS13 X15Cr13	1.4006 1.4005 1.4024
B	bone rongeurs, bone-cutting forceps, conchotomes, chisels and gouges, bone curettes, scissors with carbide inserts	forceps, forceps wlth bow handles, branch forceps, retractors, probes, dental extractlon forceps, laboratory and orthodontic pliers, dental explorers, root elevators, filling instruments, dental tweezers	springs, solid handles, screws, nuts, rivets	X20Cr13	1.4021
C	bone rongeurs, scissors, scalers, dental curettes, dental chisels	laboratory and orthodontic pliers, dental explorers, dental tweezers, dental extraction forceps, root elevators, filling instruments		X30Cr13 X29CrS13	1.4028 1.4029
D	scissors, bone rongeurs, bone-cutting forceps, conchotomes, scalpels, knives, chisels and gouges, bone curettes, wire-cutting pliers, scalers, dental curettes, dental chisels, drills, taps, countersInk cutters	root elevators, dental explorers, filling instruments		X39Cr13 X46Cr13 X46CrS13	1.4031 1.4034 1.4035
E	scalpels				
F	scalpels			X70CrMo15 X40CrMoVN16-2	1.4109 1.4123
G	scalpels, chisels and gouges, shears			X55CrMo14	1.4110
H	scissors, bone rongeurs, conchotomes, chisels and gouges, bone curettes, wire-cutting pliers, drills, taps, countersink cutters			X38CrMoV15 X38CrMo14	1.4117 1.4419
I	scissors, bone rongeurs, bone-cutting forceps, conchotomes, scalpels, knives, chisels and gouges, bone curettes, wire-cutting pliers drills, taps, countersink cutters			X50CrMoV15	1.4116
K	chisels and gouges, bone curettes			X14CrMoS17 X39CrMo17-1	1.4104 1.4122
L			solid handles, guide pins, screws, nuts	X2CrTi17 X6Cr17 X3CrTi17 X3CrNb17 X6CrNi17-1 X2CrNbZr17 X2CrTiNb18	1.4520 1.4016 1.4510 1.4511 1.4017 1.4590 1.4509
M		retractors, impression trays	hollow handles, guide pins, rivets, screws	X5CrNi18-10	1.4301
N	chisels and gouges, bone curettes	probes	solid handles, guide pins, screws, nuts, rivets	X8CrNiS18-9	1.4305
O		dental explorers	springs, screws, rivets	X9CrNi18-9	1.4325
P			screws, rivets	X6CrNiMoTi17-12-2	1.4571
R	scalers, chisels, dental curettes, drills, taps, countersink cutters	filling instruments, dental explorers, laboratory and orthodontic pliers		X90CrMoV18	1.4112
S	Scalers, chisels, dental curettes	Filling instruments, dental explorers		X105CrMo17	1.4125

3. Chemical composition

The chemical composition of the steels shall be in accordance with table 2.

The chemical composition of those steels specified in ISO 7153-1, indicated by grade numbers, are given for information only.

Table 2 — Steel grades and specified chemical compositions (cast analysis)

Elements not quoted in table2 shall not be intentionally added to the steel without the agreement of the purchaser, other than for the purpose of finishing the heat. All reasonable precautions shall be taken to prevent the addition, from scrap or other material used in manufacture, of such elements which affect hardenability, mechanical properties and applicability.

Steel Grade			Chemical Compositions (%)									Hardness
Reference Letter 1)	Grade No. according to 2) ISO 4957	Grade No. according to 2) ISO 683-13	C	Si Max.	Mn Max.	P Max.	S	Cr	Mo	Ni	Other Elements	In Rockwell (HRC) ISO 18565
Martensitic steels												
A	--	3	0,09 to 0,15	1	1	0,04	0,03 max.	11,5 to 13,5	--	1 max.	--	40-48
B	27	4	0.16 to 0,25	1	1	0,04	0,03 max.	12 to 14	--	1 max.	--	42-50
C	28	5	0,26 to 0,35	1	1	0,04	0,03 max.	12 to 14	--	1 max.	--	
D	--	--	0,42 to 0,50	1	1	0,04	0,03 max.	12,5 to 14,5	--	1 max.	--	50-58
E	--	--	0,47 to 0,57	0,5	1	0,03	0,025	13,7 to 15,2	--	0,5 max.	--	
F	--	--	0,6 to 0,7	0,5	1	0,03	max.	12 to 13,5	--	0,5 max.	--	
G	--	--	0,65 to 0,75	1	1	0,04	0,025 max. 0,03 max.	12 to 14	0,5 max.	1 max.	--	
H	--	--	0,35 to 0,4	1	1	0,045	0,03 max.	14 to 15	0,4 to 0,6	--	V: 0,1 to 0,15	50-58
I	--	--	0,42 to 0,55	1	1	0,045	0,03 max.	12 to 15	0,45 to 0,9	--	V: 0,1 to 0,15	50-58
K	30	--	0,33 to 0,43	1	1	0,03	0,03 max.	15 to 17	1 to 1,5	1 max	--	
R	--	--	0,95 to 0,95	1	1	0,045	0,03 max.	17 to 19	0,9 to 1,3	--	V: 0,07 to 0,12	
S	--	--	0,60 to 0,75	1	1	0,04	0,03 max.	16 to 18	0,75	--	--	
Ferritic steels												
L	--	8a	0,08 max.	1	1,5	0,06	0,15 to 0,35	16 to 18	0,6 max.	1 max.	--	
Austenitic steels												
M	--	11	0,07 max.	1	2	0,045	0,03 max.	17 to 19	--	8 to 11	--	
N	--	17	0,12 max.	1	2	0,06	0,15 to	17 to 19	--3)	8 to 10	--	
O	--	14	0,15 max.	1	2	0,045	0,35 0,03 max.	16 to 18	--	6 to 8	--	
P	--	20	0,07 max.	1	2	0,045	0,03 max.	16,5 to 18,5	2 to 2,5	10,5 to 13,5	--	

1) The reference letters are used for the purpose of cross-referencing.
2) The grade numbers are provisional and will be subject to alteration when the relevant International Standards are published.
3) The manufacturer has the option of adding molybdenum up to 0,7 %.

RUDOLF MEDICAL GmbH + Co. KG
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