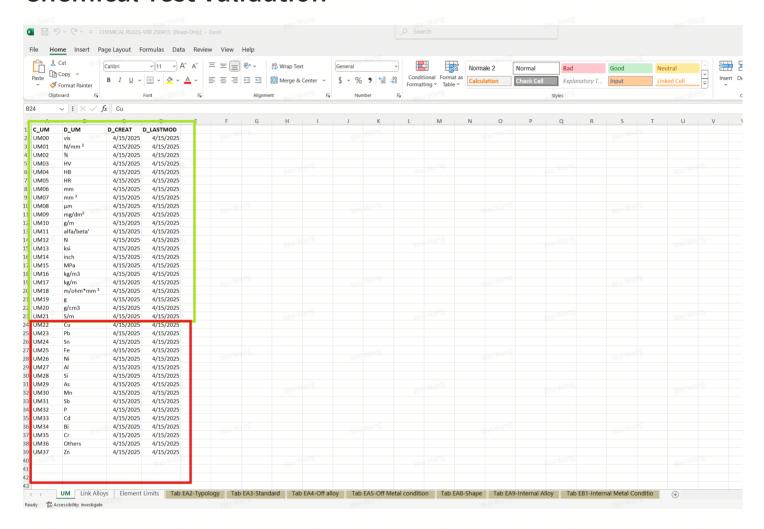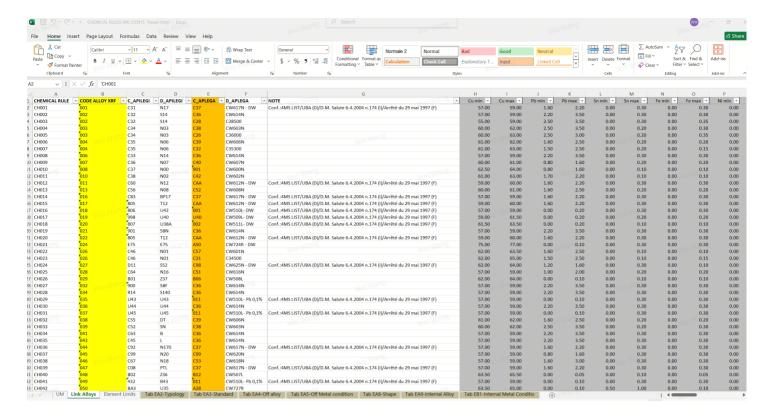# How to validate Chemical/Mechanical results

Chemical Test Validation

Green part means the mechanical test units, column A means the corresponding codes

Red part means the chemical composition, column A means the corresponding codes.

Saved in the system as masterdata.

First table (Link Alloys sheet)

CHEMICAL RULE	CODE ALLOY XRF	C_APILEGI	D_APILEGI	C_APLEGA	D_APLEGA	NOTE	Cu min	Cu max	Pb min	Pb max	Sn min	Sn max	Fe min	Fe max	Ni
CH001	001	C31	N17	C37	CW617N - DW	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	57.00	59.00	1.60	2.20	0.00	0.30	0.00	0.30	0.00
CH002	002	C32	S14	C36	CW614N		57.00	59.00	2.20	3.50	0.00	0.30	0.00	0.30	0.00
CH003	002	C32	S14	C28	C38500		55.00	59.00	2.50	3.50	0.00	0.30	0.00	0.35	0.00
CH004	003	C34	N03	C38	CW603N		60.00	62.00	2.50	3.50	0.00	0.30	0.00	0.30	0.00
CH005	003	C34	N03	C26	C36000		60.00	63.00	2.50	3.00	0.00	0.20	0.00	0.35	0.00
CH006	004	C35	N06	C39	CW606N		61.00	62.00	1.60	2.50	0.00	0.20	0.00	0.20	0.00
CH007	004	C35	N06	C32	C35300		61.00	63.00	1.50	2.50	0.00	0.20	0.00	0.15	0.00
CH008	006	C33	N14	C36	CW614N		57.00	59.00	2.20	3.50	0.00	0.30	0.00	0.30	0.00
CH009	007	C36	N07	C40	CW607N		60.00	61.00	0.80	1.60	0.00	0.20	0.00	0.20	0.00
CH010	008	C37	N00	901	CW600N		62.50	64.00	0.80	1.60	0.00	0.10	0.00	0.10	0.00
CH011	010	C38	N02	C42	CW602N		61.00	63.00	1.70	2.20	0.00	0.10	0.00	0.10	0.00
CH012	011	C60	N12	CAA	CW612N - DW	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	59.00	60.00	1.60	2.20	0.00	0.30	0.00	0.30	0.00
CH013	013	C56	N08	C52	CW608N		60.00	61.00	1.60	2.50	0.00	0.20	0.00	0.30	0.00
CH014	016	C83	BP17	C37	CW617N - DW	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	57.00	59.00	1.60	2.20	0.00	0.30	0.00	0.30	0.00
CH015	017	805	T12	CAA	CW612N - DW	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	59.00	60.00	1.60	2.20	0.00	0.30	0.00	0.30	0.00
CH016	018	806	U42	001	CW510L- DW	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	57.00	59.00	0.00	0.20	0.00	0.30	0.00	0.30	0.00
CH017	019	998	U40	U40	CW509L- DW	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	59.00	61.50	0.00	0.20	0.00	0.20	0.00	0.20	0.00
CH018	020	807	U38A	002	CW511L- DW	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	61.50	63.50	0.00	0.20	0.00	0.10	0.00	0.30	0.00
CH019	021	901	58N	C36	CW614N		57.00	59.00	2.20	3.50	0.00	0.30	0.00	0.30	0.00
CH020	022	805	T12	CAA	CW612N - DW	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	59.00	60.00	1.60	2.20	0.00	0.30	0.00	0.30	0.00
CH021	024	E75	E75	A50	CW724R - DW		75.00	77.00	0.00	0.10	0.00	0.30	0.00	0.30	0.00
CH022	026	C46	N01	C57	CW601N		62.00	63.50	1.60	2.50	0.00	0.10	0.00	0.10	0.00
CH023	026	C46	N01	C31	C34500		62.00	65.00	1.50	2.50	0.00	0.10	0.00	0.15	0.00
CH024	027	D11	S52	C98	CW625N - DW	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	62.00	64.00	1.20	1.60	0.00	0.30	0.00	0.30	0.00
CH025	028	C64	N16	C51	CW616N		57.00	59.00	1.00	2.00	0.00	0.20	0.00	0.20	0.00
CH026	029	B01	Z37	B06	CW508L		62.00	64.00	0.00	0.10	0.00	0.30	0.00	0.30	0.00
CH027	032	900	58F	C36	CW614N		57.00	59.00	2.20	3.50	0.00	0.30	0.00	0.30	0.00
CH028	034	R14	S140	C36	CW614N		57.00	59.00	2.20	3.50	0.00	0.30	0.00	0.30	0.00
CH029	035	U43	U43	011	CW510L- Pb 0,1%	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	57.00	59.00	0.00	0.10	0.00	0.30	0.00	0.30	0.00
CH030	036	U44	U44	C36	CW614N		57.00	59.00	2.20	3.50	0.00	0.30	0.00	0.30	0.00
CH031	037	U45	U45	011	CW510L- Pb 0,1%	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	57.00	59.00	0.00	0.10	0.00	0.30	0.00	0.30	0.00
CH032	038	C55	DT	C39	CW606N		61.00	62.00	1.60	2.50	0.00	0.20	0.00	0.20	0.00
CH033	039	C52	SN	C38	CW603N		60.00	62.00	2.50	3.50	0.00	0.20	0.00	0.30	0.00
CH034	041	C63	B	C36	CW614N		57.00	59.00	2.20	3.50	0.00	0.30	0.00	0.30	0.00
CH035	043	C45	L	C36	CW614N		57.00	59.00	2.20	3.50	0.00	0.30	0.00	0.30	0.00
CH036	044	C92	N170	C37	CW617N - DW	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	57.00	59.00	1.60	2.20	0.00	0.30	0.00	0.30	0.00
CH037	045	C99	N20	C99	CW620N		57.00	59.00	0.80	1.60	0.00	0.30	0.00	0.30	0.00
CH038	046	C67	N18	C53	CW618N		57.00	59.00	1.60	3.00	0.00	0.30	0.00	0.30	0.00
CH039	047	C08	PTL	C37	CW617N - DW	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	57.00	59.00	1.60	2.20	0.00	0.30	0.00	0.30	0.00
CH040	048	B02	Z36	B12	CW507L		63.50	65.50	0.00	0.05	0.00	0.30	0.00	0.05	0.00
CH041	049	432	B43	011	CW510L- Pb 0,1%	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	57.00	59.00	0.00	0.10	0.00	0.30	0.00	0.30	0.00
CH042	050	BA3	U35	A28	CW727R		63.50	65.00	0.00	0.10	0.50	1.00	0.00	0.10	

Sheet tabs: UM | Link Alloys | Element Limits | Tab EA2-Typology | Tab EA3-Standard | Tab EA4-Off alloy | Tab EA5-Off Metal condition | Tab EA8-Shape | Tab EA9-Internal Alloy | Tab EB1-Internal Metal Conditio
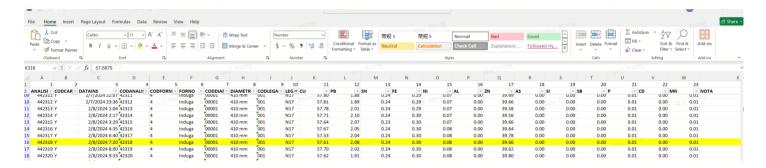
Column A means the corresponding rules name, one alloy can have more rules.
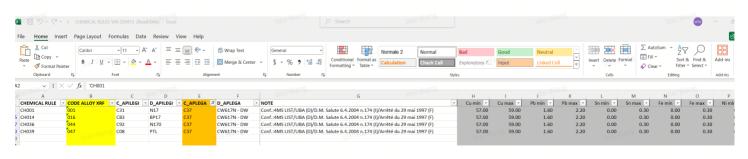
Column B means the alloy code in the labor devices

Column C means internal alloy code

Column D means the internal alloy description code

Column E means the official alloy code

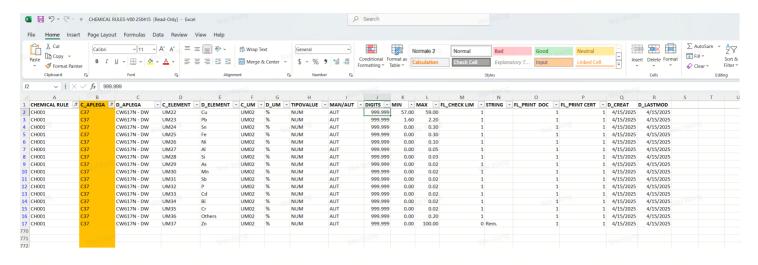|	ANALISI	CODCAR	DATAINS	CODANALI	CODFORN	FORNO	CODDIAI	DIAMETR	CODLEGA	LEG	CU	PB	SN	FE	NI	AL	ZN	AS	SI	SB	P	CD	MN	NOTA
9	442311 Y		2/7/2024 22:07	42311	4	Induga	00001	410 mm	001	N17	57.80	1.88	0.24	0.29	0.07	0.00	39.69	0.00	0.00	0.00	0.01	0.00	0.01	
10	442312 Y		2/7/2024 23:36	42312	4	Induga	00001	410 mm	001	N17	57.81	1.89	0.24	0.29	0.07	0.00	39.69	0.00	0.00	0.00	0.01	0.00	0.01	
11	442313 Y		2/8/2024 1:04	42313	4	Induga	00001	410 mm	001	N17	57.78	2.01	0.24	0.29	0.07	0.00	39.58	0.00	0.00	0.00	0.01	0.00	0.01	
12	442314 Y		2/8/2024 2:17	42314	4	Induga	00001	410 mm	001	N17	57.71	2.10	0.24	0.30	0.07	0.00	39.56	0.00	0.00	0.00	0.01	0.00	0.01	
13	442315 Y		2/8/2024 3:29	42315	4	Induga	00001	410 mm	001	N17	57.64	2.07	0.23	0.30	0.07	0.00	39.66	0.00	0.00	0.00	0.01	0.00	0.01	
14	442316 Y		2/8/2024 4:35	42316	4	Induga	00001	410 mm	001	N17	57.67	2.05	0.24	0.30	0.08	0.00	39.64	0.00	0.00	0.00	0.01	0.00	0.01	
15	442317 Y		2/8/2024 6:40	42317	4	Induga	00001	410 mm	001	N17	57.53	2.04	0.24	0.30	0.08	0.00	39.78	0.00	0.00	0.00	0.01	0.00	0.01	
16	442318 Y		2/8/2024 7:20	42318	4	Induga	00001	410 mm	001	N17	57.61	2.08	0.24	0.30	0.08	0.00	39.66	0.00	0.00	0.00	0.01	0.00	0.01	
17	442319 Y		2/8/2024 8:00	42319	4	Induga	00001	410 mm	001	N17	57.70	2.02	0.24	0.30	0.08	0.00	39.62	0.00	0.00	0.00	0.01	0.00	0.01	
18	442320 Y		2/8/2024 9:33	42320	4	Induga	00001	410 mm	001	N17	57.62	1.91	0.24	0.30	0.08	0.00	39.80	0.00	0.00	0.00	0.01	0.00	0.01	

When a chemical analyze result comes, the alloy code in the labor device is 001 (cell I16), then we search 001 in the below table Column B (link alloys), it refers to chemical rules CH001

CHEMICAL RULE	CODE ALLOY XRF	C_APILEGI	D_APILEGI	C_APLEGA	D_APLEGA	NOTE	Cu min	Cu max	Pb min	Pb max	Sn min	Sn max	Fe min	Fe max	Ni min
CH001	001	C31	N17	C37	CW617N - DW	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	57.00	59.00	1.60	2.20	0.00	0.30	0.00	0.30	
CH014	016	C83	BP17	C37	CW617N - DW	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	57.00	59.00	1.60	2.20	0.00	0.30	0.00	0.30	
CH036	044	C92	N170	C37	CW617N - DW	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	57.00	59.00	1.60	2.20	0.00	0.30	0.00	0.30	
CH039	047	C08	PTL	C37	CW617N - DW	Conf.:4MS LIST/UBA (D)/D.M. Salute 6.4.2004 n.174 (I)/Arrêté du 29 mai 1997 (F)	57.00	59.00	1.60	2.20	0.00	0.30	0.00	0.30	

Then in sub-table element limits, under CH001, the corresponding tested elements and range are shown.

Logic: 001 (Code alloy xrf)=> CH001 (chemical rule)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	CHEMICAL RULE	C_APLEGA	D_APLEGA	C_ELEMENT	D_ELEMENT	C_UM	D_UM	TIPOVALUE	MAN/AUT	DIGITS	MIN	MAX	FL_CHECK LIM	STRING	FL_PRINT DOC	FL_PRINT CERT	D_CREAT	D_LASTMOD
2	CH001	C37	CW617N - DW	UM22	Cu	UM02	%	NUM	AUT	999.999	57.00	59.00	1		1	1	4/15/2025	4/15/2025
3	CH001	C37	CW617N - DW	UM23	Pb	UM02	%	NUM	AUT	999.999	1.60	2.20	1		1	1	4/15/2025	4/15/2025
4	CH001	C37	CW617N - DW	UM24	Sn	UM02	%	NUM	AUT	999.999	0.00	0.30	1		1	1	4/15/2025	4/15/2025
5	CH001	C37	CW617N - DW	UM25	Fe	UM02	%	NUM	AUT	999.999	0.00	0.30	1		1	1	4/15/2025	4/15/2025
6	CH001	C37	CW617N - DW	UM26	Ni	UM02	%	NUM	AUT	999.999	0.00	0.10	1		1	1	4/15/2025	4/15/2025
7	CH001	C37	CW617N - DW	UM27	Al	UM02	%	NUM	AUT	999.999	0.00	0.05	1		1	1	4/15/2025	4/15/2025
8	CH001	C37	CW617N - DW	UM28	Si	UM02	%	NUM	AUT	999.999	0.00	0.03	1		1	1	4/15/2025	4/15/2025
9	CH001	C37	CW617N - DW	UM29	As	UM02	%	NUM	AUT	999.999	0.00	0.02	1		1	1	4/15/2025	4/15/2025
10	CH001	C37	CW617N - DW	UM30	Mn	UM02	%	NUM	AUT	999.999	0.00	0.02	1		1	1	4/15/2025	4/15/2025
11	CH001	C37	CW617N - DW	UM31	Sb	UM02	%	NUM	AUT	999.999	0.00	0.02	1		1	1	4/15/2025	4/15/2025
12	CH001	C37	CW617N - DW	UM32	P	UM02	%	NUM	AUT	999.999	0.00	0.02	1		1	1	4/15/2025	4/15/2025
13	CH001	C37	CW617N - DW	UM33	Cd	UM02	%	NUM	AUT	999.999	0.00	0.02	1		1	1	4/15/2025	4/15/2025
14	CH001	C37	CW617N - DW	UM34	Bi	UM02	%	NUM	AUT	999.999	0.00	0.02	1		1	1	4/15/2025	4/15/2025
15	CH001	C37	CW617N - DW	UM35	Cr	UM02	%	NUM	AUT	999.999	0.00	0.02	1		1	1	4/15/2025	4/15/2025
16	CH001	C37	CW617N - DW	UM36	Others	UM02	%	NUM	AUT	999.999	0.00	0.20	1		1	1	4/15/2025	4/15/2025
17	CH001	C37	CW617N - DW	UM37	Zn	UM02	%	NUM	AUT	999.999	0.00	100.00	0	Rem.	1	1	4/15/2025	4/15/2025

Column b: official alloy code,

Column c: description of the alloy

Column d: the chemical element code

Column E: chemical element

Column F: the code of the unit

Column G: unit

Column H: means the result is shown in number

Column I: the results will be transfered automatically

Column J: maximal digits

Column K and L, the tolerance

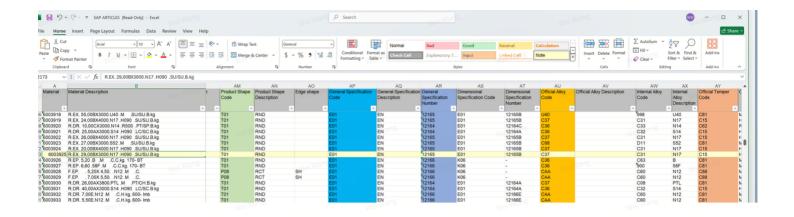M: flag of the elements, 1 means the elements results should be shown

N: flag of elements, Rem. Means this elements results wont be be shown in number, rather in text Rem. (means remain)

O: flag of shown in internal report

P: flag of shown in certificate

Mechanical Test Validation

When a material should be tested, the detailed material parameters are in SAP, we need article typology code (in this case B0), general specification code E01/ Product Shape Code T01/ Official alloy code C37/ Internal alloy description N17 to locate which kind of mechanical test we need to use

In this case, the mechanical test rule is ME0074,
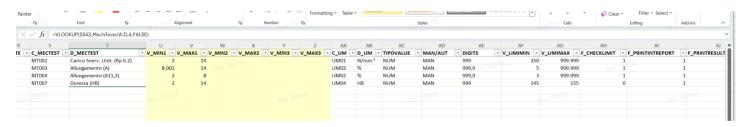

The corresponding sub tests are shown below (drag/ press/ hardness)

Column U and V refers to dimention2 the name in SAP, WX are the dimention3 the name in SAP, YZ are the demention4 the name in SAP (size), column AF and AG refer to range.

All the mechanical test data should be input manually, the AUT in below means the units should be converted (e.g. mm into inch)

N_MECTEST	C_UM	D_UM	D_MECTEST	TIPOVALUE	MAN/AUT	DIGITS	E_DESCR_IT	E_DESCR_EN	E_DESCR_FR	E_DESCR_DE	E_DESCR_ES	B0	B1	B2	B3	B4	B5	B6	B7	D_CREAT
MT001	UM01	N/mm²	Carico Rottura Unitario (Rm)	NUM	MAN	999	Rm	Tensile Strength	Rm	Rm	Rm	X	X	X	X	X	X			4/15/2025
MT002	UM01	N/mm²	Carico Snerv. Unit. (Rp 0.2)	NUM	MAN	999,9	Rp 0.2	Yeld St. 0.2	Rp 0.2	Rp 0.2	Rp 0.2	X	X	X	X	X	X			4/15/2025
MT003	UM02	%	Allungamento (A)	NUM	MAN	999,9	A	A	A	A	A	X	X	X	X	X	X			4/15/2025
MT004	UM02	%	Allungamento (A11,3)	NUM	MAN	999,9	A 11,3	A 11,3	A 11,3	A 11,3	A 11,3	X	X	X	X	X	X			4/15/2025
MT005	UM02	%	Allungamento (A100 mm)	NUM	MAN	999,9	A 100mm	A 100mm	A 100mm	A 100mm	A 100mm	X	X	X	X	X	X			4/15/2025
MT006	UM03	HV	Durezza (HV)	NUM	MAN	999	HV	HV	HV	HV	HV	X	X	X	X	X	X			4/15/2025
MT007	UM04	HB	Durezza (HB)	NUM	MAN	999	HB	HB	HB	HB	HB	X	X	X	X	X	X			4/15/2025
MT008	UM05	HR	Durezza (HRB)	NUM	MAN	999	HRB	HRB	HRB	HRB	HRB	X	X	X	X	X	X			4/15/2025
MT009	UM06	mm	Diam./Lato/Chiave	NUM	MAN	999,999	Dimensione	Size	Dimension	Size	Size	X	X						X	4/15/2025
MT010	UM14	inch	Diam./Lato/Chiave_inch	NUM	AUT- CONV	999,999	Dimensione_inch	Size_inch	Dimension_inch	Size_inch	Size_inch	X	X						X	4/15/2025
MT011	UM06	mm	Larghezza	NUM	MAN	999,999	Larghezza	Width	Largeur	Breite	Width			X	X					4/15/2025
MT012	UM14	inch	Larghezza_inch	NUM	AUT- CONV	999,999	Larghezza_inch	Width_inch	Largeur_inch	Breite_inch	Width_inch			X	X					4/15/2025
MT013	UM06	mm	Diam. Interno	NUM	MAN	999,999	Dimensione Interna	Inner Size	Dimension Int	Inner Size	Inner Size								X	4/15/2025
MT014	UM14	inch	Diam. Interno_inch	NUM	AUT- CONV	999,999	Dimensione Interna_inch	Inner Size_inch	Dimension Int_inch	Inner Size_inch	Inner Size_inch								X	4/15/2025
MT015	UM01	N/mm²	Carico Snerv. Unit. (Rp 0.5)	NUM	MAN	999	Rp 0.5	Yeld St. 0.5	Rp 0.5	Rp 0.5	Rp 0.5	X	X	X	X	X	X			4/15/2025
MT016	UM02	%	Allungamento	NUM	MAN	999,9	A	A	A	A	A	X								4/15/2025
MT017	UM02	%	Allungamento (50 mm)	NUM	MAN	999,9	A 50mm	A 50mm	A 50mm	A 50mm	A 50mm	X								4/15/2025
MT018	UM04	HB	Durezza frontale (HB)	NUM	MAN	999	Durezza frontale (HB)	Frontal Hardness (HB)	Frontal Hardness (HB)	Frontal Hardness (HB)	Frontal Hardness (HB)	X								4/15/2025
MT019	UM04	HB	Durezza laterale (HB)	NUM	MAN	999	Durezza laterale (HB)	Lateral Hardness (HB)	Lateral Hardness (HB)	Lateral Hardness (HB)	Lateral Hardness (HB)	X								4/15/2025
MT020	UM04	HB	Durezza centrale (HB)	NUM	MAN	999	Durezza centrale (HB)	Central Hardness (HB)	Central Hardness (HB)	Central Hardness (HB)	Central Hardness (HB)	X								4/15/2025
MT021	UM13	ksi	Car. Rottura Unit. (Rm)_ksi	NUM	AUT- CONV	999	Rm	Tensile Streng.	Rm	Rm	Rm	X	X	X	X	X	X	X	X	4/15/2025
MT022	UM13	ksi	Car. Sner. Un. (Rp0.5)_ksi	NUM	AUT- CONV	999	Rp 0.5	Yeld St. 0.5	Rp 0.5	Rp 0.5	Rp 0.5	X	X	X	X	X	X	X	X	4/15/2025
MT023	UM02	%	Allungamento 4x	NUM	MAN	999,9	A (4 x diametro)	Elong. (4 x diam.)	A (4 x diameter)	A (4 x diameter)	A (4 x diameter)	X	X	X	X	X	X	X		4/15/2025
MT024	UM02	%	Allung. (50.8 mm)	NUM	MAN	999,9	A (2-in)	Elong. (2-in)	Elongation (2-in)	Elongation (2-in)	Elongation (2-in)	X	X	X	X	X	X	X		4/15/2025
MT025	UM00	vis	Stress corrosion test	LOG	MAN	OK/KO	Stress corrosion test	Stress corrosion test	Stress corrosion test	Stress corrosion test	Stress corrosion test	X								4/15/2025
MT026	UM08	µm	Dezincification resist. test	NUM	MAN	999,9	Dezincification resist. test	Dezincification resist. test	Dezincification resist. test	Dezincification resist. test	Dezincification resist. test	X								4/15/2025
MT027	UM02	%	Fase ß	NUM	MAN	999,9	Fase ß	ß Phase	Phase ß	Phase ß	Fase ß	X	X	X	X	X	X			4/15/2025
MT028	UM20	g/cm3	Densità	NUM	MAN	999,9	Densità (g/cm3)	Density (g/cm3)	Density (g/cm3)	Density (g/cm3)	Density (g/cm3)	X	X	X						4/15/2025
MT029	UM21	S/m	Conduttività	NUM	MAN	999,9	Conduttivita' Elettrica	Electrical Conductivity	Conductivité Electr.	Electrical Conductivity	Electrical Conductivity	X	X	X						4/15/2025
MT030	UM00	vis	Aspetto superficiale	LOG	MAN	OK/KO	Aspetto superf.	Surface aspect	Surface aspect	Surface aspect	Surface aspect	X							X	4/15/2025

Sheet tabs: UM | MechTests | Limits | Tab EA2-Typology | Tab EA3-Standard | Tab EA4-Off Alloy | Tab EA5-Off Metal Condition | Tab EA8-Shape | Tab EA9-Internal Alloy | Tab EB1-Internal Metal Conditio