

TITOLCHIMICA®

METALLOGRAPHY

Line



Designation: E 407 – 99

Standard Practice for Microetching Metals and Alloys

This standard is issued under the fixed designation E 407; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last supersession (in parentheses); the number in brackets indicates the year of approval. A superscripted epsilon (ϵ) indicates an editorial change since the last revision of the standard.

1. Scope

1.1 This practice covers chemical solutions and procedures to be used in etching metals and alloys for metallographic examination. Safety precautions and miscellaneous information are also included.

1.2 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. For a complete catalog of cautionary statements, see 6.1 and Table 1.

2. Referenced Documents

2.1 ASTM Standards
D 1193 Specification for Reagents, Analytical

3. Terminology

3.1 Definitions

3.1.1 For definitions of terms used in this practice, refer to the following:

3.2 Definitions

3.2.1 *int* etching

contrast, often used to reveal microstructure.

3.2.2 *ext* etching

reveals surface features.

3.2.3 *etchant*

etching solution.

3.2.4 *etching time*

time required to achieve the desired etch.

3.2.5 *etching rate*

rate at which the etchant attacks the metal.

3.2.6 *etching solution*

etchant.

3.2.7 *etching product*

product of the etching reaction.

3.2.8 *etching residue*

residue left on the metal surface after etching.

3.2.9 *etching solution*

etchant.

3.2.10 *etching solution*

etchant.

3.2.11 *etching solution*

etchant.

3.2.12 *etching solution*

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3.2.13 *etching solution*

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3.2.14 *etching solution*

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3.2.36 *etching solution*

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3.2.37 *etching solution*

etchant.



Linea Normativa

La necessità di utilizzare metodi di analisi ufficialmente riconosciuti, per la garanzia di conformità della propria produzione, trova nelle linee di reagenti Titolchimica secondo Normative, le soluzioni più convenienti e sicure per disporre delle speciali formulazioni previste.

“Linea Normativa 1: Metallografia”

La corretta identificazione della struttura metallografica di metalli e di varie leghe è un’esigenza indispensabile per la qualifica dei **manufatti dell’industria meccanica, siderurgica, medicale, automobilistica, aerospaziale** e simili.

La linea Metallografia di Titolchimica comprende reagenti **“etching agent”** conformi alle varie normative in vigore, a partire dalla **ASTM E407** di riferimento. Ogni reagente è preparato nei nostri laboratori secondo procedure standardizzate, con materie prime di grado di purezza idoneo (ACS, PH.EUR ecc) e accanto alla produzione dei nostri reagenti di gamma.

Si sottolineano le precauzioni di sicurezza ancora più importanti nelle reazioni di attacco dei metalli: pertanto si consiglia vivamente di attenersi alle indicazioni riportate nelle Schede di Sicurezza dei prodotti. A questo scopo Titolchimica confeziona inoltre i reagenti, laddove previsto, in **flaconi di vetro “viplato”** che evitano la dispersione delle sostanze pericolose in caso di rotture per cadute.

Normative Line

The need to use officially recognized methods of analysis, to guarantee the conformity of its own production, finds in the Titolchimica reagent lines according to Regulations, the most convenient and safe solutions in order to ensure the special provided formulations.

“Normative Line 1: Metallography”

The correct identification of the metallographic structure of metals and various alloys is an essential requirement for the qualification of **mechanical, steel, medical, automotive, aerospace** and similar products.

The Titolchimica Metallography line includes **“etching agent”** reagents with ongoing compliance with industry standards, from normative reference **ASTM E407**. Each reagent is prepared in our laboratories according to standardised procedures, with raw materials having suitable purity level (ACS, PH.EUR etc.) and in addition to the production of our range reagents.

It shall emphasise the safety precautions, which are even more important in the etching reactions of metals: therefore, we strongly recommend following the instructions given in the product Safety Data Sheets. For this purpose, Titolchimica also packs the reagents, where required, in **“viplated” glass bottles** in order to prevent the dispersion of dangerous substances in the event of breakage due to falls.

Per maggiori informazioni - For more information:

TITOLCHIMICA S.p.A

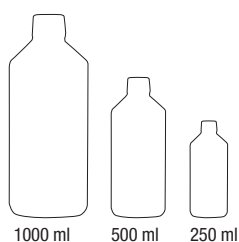
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Estratto parziale dei reagenti della linea. Altre formulazioni non comprese fornibili a richiesta.
 Partial extract of line reagents. Other not included formulations available on request.

CODICE/CODE	DESCRIZIONE/DESCRIPTION	COMMONLY USED	COMUNE IMPIEGO
TC15268	ADLER ETCHANT	STEEL, WELDINGS, MACRO ETCHING	ACCIAIO, SALDATURE, MACRO INCISIONI
TC59520	KALLING 2 ETCHANT (94)	NICKEL, NICKEL ALLOYS, STAINLESS STEELS	NICHEL, LEGHE DI NI, ACCIAIO INOSSIDABILE
TC59515	KELLER ETCHANT (3)	ALUMINUM, TITANIUM ALLOYS	ALLUMINIO, LEGHE DI TITANIO
TC40079	KLEMM'S COLOR ETCHING 1	LOW CARBON STEELS	ACCIAIO A BASSO CONTENUTO DI CARBONIO
VARIOUS	NITAL 2 - 8%	UNALLOYED AND LOW ALLOYED STEELS	ACCIAI NON LEGATI E A BASSA LEGA
VARIOUS	PICRAL 2 - 4%	MARTENSITIC STAINLESS STEEL	ACCIAIO INOSSIDABILE MARTENSITICO
TC52864	MARBLE ETCHANT	NI-CO AND NI-FE ALLOYS	LEGHE DI NI-CO E NI-FE
TC69930	MURAKAMI ETCHANT	HARD METALS, MO/MO - CR AND W ALLOYS	METALLI DURI, LEGHE DI MO/MO, CR E W
TC76415	VILELLA ETCHANT	FERRITE, STAINLESS STEELS	FERRITE, ACCIAIO INOSSIDABILE
TC76420	VILELLA ETCHANT 80	FERRITE, STAINLESS STEELS	FERRITE, ACCIAIO INOSSIDABILE
TC92684	BERAHA ETCHANTS	VARIOUS	VARI
TC15637	KROLL ETCHANT	ALUMINUM, TITANIUM, ALLOYS	ALLUMINIO, TITANIO, LEGHE
TC57940	HEYN ETCHANT	STAINLESS STEELS	ACCIAI INOSSIDABILI
TC76900	UNICO COGNE REAGENT	SPECIAL STAINLESS STEELS	ACCIAI INOSSIDABILI SPECIALI
TC28413	FRY ETCHANT	STAINLESS STEELS	ACCIAI INOSSIDABILI
TC20510	GRAFF-SARGENT ETCHANT	GRAIN SIZE	GRANULOMETRIA
TC20502	POULTON ETCHANT	ALUMINUM	ALLUMINIO
TC64259	GLYCEREGIA	AUSTENITIC STAINLESS STEELS, NI-CR ALLOYS	ACCIAI INOSSIDABILI AUSTENITICI, LEGHE NI-CR
TC65408	RALPH ETCHANT	STAINLESS STEELS	ACCIAI INOSSIDABILI
TC54291	BARKER ETCHANT	ALUMINUM GRAIN BOUNDARIES	BORDI GRANO STRUTTURE IN ALLUMINIO
TC25254	FERROXYL 1 ASTM A380	IRON RESIDUES ON STAINLESS STEELS	RESIDUI DI FERRO SUGLI ACCIAI INOSSIDABILI
TC25256	FERROXYL 2 ASTM A380	IRON RESIDUES ON STAINLESS STEELS	RESIDUI DI FERRO SUGLI ACCIAI INOSSIDABILI
TC40108	ASTM E407 N.98	IRON ALLOYS	LEGHE DI FERRO
TC40105	ASTM E407 N.220 DUPLEX/SD	FERRITE IN STAINLESS STEELS	FERRITE IN ACCIAIO INOSSIDABILE
TC40101	ASTM E407 N.13 OXALIC ACID	CHROMIUM, IRON,	CROMO, FERRO
TC89822	ELECTROLYTIC N.2	POLISHING STAINLESS STEELS	LUCIDATURA ACCIAIO INOSSIDABILE
TC54525	TRIACID A	ALUMINUM	ALLUMINIO
TC54557	TRIACID B	ALUMINUM	ALLUMINIO
TC54469	RAMEIC ETCHANT	ALUMINUM	ALLUMINIO
TC35318	SODIUM PICRATE 85 ASTM 407	IRON ALLOYS	LEGHE DI FERRO
TC12812	CHROMIC ACID 83	IRON ALLOYS	LEGHE DI FERRO
TC32253	ASTM E407 N.45	CU-AL ALLOYS	LEGHE DI RAME-ALLUMINIO
TC52405	ASTM E407 N.40	NI-CU ALLOYS	LEGHE DI NICHEL-RAME
TC54476	FERRIC CHLORIDE ETCHANT	COPPER, COPPER ALLOYS	COPPER, LEGHE COPPER
TC54508	ASTM E407 N.82	IRON ALLOYS	LEGHE DI FERRO
TC76426	ASTM ETCHANT N.46	CU-BE ALLOYS	LEGHE RAME-BERILLIO
TC73545	AUSTENITIC GRAIN REAGENT	AUSTENITIC GRAIN	GRANO AUSTENITICO



Flacone in vetro viplato
 Viplated glass bottle

