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AUTOMATIVE INDUSTRY STANDARD OF
THE PEOPLE'S REPUBLIC OF CHINA

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QC/T 625-2013

Replacing QC/T 625-1999

**Metallic coatings and conversion coating for
automobile**

汽车用涂镀层和化学处理层

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Announcement

Ministry of Industry and Information Technology of the People's Republic of China

No.23 2013

The Ministry of Industry and Information Technology has approved 948 industry standards (see Attachment 1 for standard No., standard name, main content and implementation date) such as "Electromagnetic pulse valve for bag filters", etc. and 6 non-ferrous metal industry standard specimens (see Attachment 2 and Attachment 3 for standard specimens catalogue and composition content table), including: 377 industry standards of machinery industry, 8 industry standards of pharmaceutical equipment industry, 98 industry standards of ship industry, 71 industry standards of auto industry, 34 industry standards of aviation industry, 3 industry standards of chemical industry, 49 industry standards of metallurgical industry, 45 industry standards of non-ferrous metal industry, 64 industry standards of building materials industry, 5 industry standards of rare earth industry, 6 industry standards of gold industry, 5 industry standards of packaging industry, 4 industry standards of electronic industry and 179 industry standards of communication industry, which are issued now.

The above-mentioned industry standards of machinery industry are published by China Machine Press; industry standards of pharmaceutical equipment, automotive and packaging industries are published by China Planning Press; industry standards of ship industry are organized-published by China Institute of Marine Technology & Economy; industry standards of aviation industry are organized to be published by AVIC China Aero-polytechnology Research Institute; industry standards of chemical industry are published by Chemical Industry Press; industry standards of metallurgical industry are published by Metallurgical Industry Press; industry standards of non-ferrous metal, rare earth and gold industries are published by China Standards Press; industry standards of building materials industry are published by China Building Materials Press; industry standards of electronic industry are organized to be published by China Electronic Standardization Institute of the Ministry of Industry and Information Technology; and industry standards of communication industry are published by Post & Telecom Press.

Attachment: standard No., standard name and implementation date of 71 industry standards of automotive industry.

Ministry of Industry and Information Technology of P. R. China

April 25, 2013

Attachment

Standard No., standard name and implementation date of 71 industry standards of automotive industry

No.	Standard No.	Standard name	Standard No. replaced	Implementation date
476	QC/T 427-2013	Automobile use battery main switch technical requirement	QC/T 427-1999	2013-09-01
477	QC/T 431-2013	Spark plug ceramic insulator specifications	QC/T 431-1999 QC/T 432-1999 QC/T 433-1999 QC/T 434-1999 QC/T 435-1999 QC/T 436-1999 QC/T 437-1999	2013-09-01
478	QC/T 29032-2013	Alarms sensor for automobile air filters	QC/T 29032-1991	2013-09-01
479	QC/T 526-2013	Automobile engine - Engineering approval evaluation program	QC/T 526-1999	2013-09-01
480	QC/T 68-2013	Technical Specification of Magneto for Motorcycles and Mopeds	QC/T 68-1993 QC/T 69-1993	2013-09-01
481	QC/T 898-2013	Wire spoke of motorcycles and mopeds		2013-09-01
482	QC/T 899-2013	Spoke nipple of motorcycles and mopeds		2013-09-01
483	QC/T 684-2013	Specifications of sealing gaskets for engines of motorcycles and mopeds	QC/T 684-2002	2013-09-01
484	QC/T 225-2013	Technical Specification of Starting Motor for Motorcycles and Mopeds	QC/T 225-1997	2013-09-01
485	QC/T 64-2013	Carburetor of motorcycle and moped	QC/64-2013 QC/65-2013	2013-09-01
486	QC/T 902-2013	Technical Specifications of Motorcycle Electronic Control Fuel-injection System		2013-09-01
487	QC/T 29117-2014	Test Regulations for the Engine of Motorcycle and Moped Production Quality	QC/T 29117.10-1993	2013-09-01
488	QC/T 29115-2013	Test regulations for motorcycle and moped production quality	QC/T 29115-1993 QC/T 29117.2-1993 QC/T 20117.3-1993	2013-09-01
489	QC/T 903-2013	Fault-types for motorcycles and mopeds		2013-09-01
490	QC/T 904-2013	Wheels hub of motorcycles and mopeds		2013-09-01
491	QC/T 305-2013	Motor vehicles - Hydraulic power steering control valve - Performance requirements and test methods	QC/T 305-1999 QC/T 306-1999	2013-09-01
492	QC/T 529-2013	Motor vehicles - Hydraulic power steering gear - Technique requirements and test methods	QC/T 529-2000 QC/T 530-2000	2013-09-01
493	QC/T 649-2013	Motor vehicles - Steering control mechanism - Performance	QC/T 649-2000	2013-09-01

		requirements and test methods		
494	QC/T 647-2013	Motor vehicles - Steering universal joint - Performance requirements and test methods	QC/T 647-2000	2013-09-01
495	QC/T 905-2013	Protecting facility for automotive		2013-09-01
496	QC/T 47-2013	Automobile seat terminology	QC/T 47-1992	2013-09-01
497	QC/T 906-2013	Technical Requirements And Test Methods of Hemp Fiber Board For Automobile Interior Trim		2013-09-01
498	QC/T 907-2013	Methods of testing performance of radiators for automobile		2013-09-01
499	QC/T 29061-2013	Engineering specification for auto engine wax thermostat	QC/T 29061-1992	2013-09-01
500	QC/T 908-2013	Horse vehicle		2013-09-01
501	QC/T 909-2013	Mobile mixing semi-trailer for bitumen-cement-mortar		2013-09-01
502	QC/T 910-2013	Glass transport semi-trailer		2013-09-01
503	QC/T 911-2013	Power supply vehicle		2013-09-01
504	QC/T 912-2013	Technical requirements for matching of towing vehicle and semi-trailer		2013-09-01
505	QC/T 913-2013	General technical specifications for platform trailer with hydraulic suspension		2013-09-01
506	QC/T 914-2013	Engineering approval evaluation program of dimethyl ether vehicle		2013-09-01
507	QC/T 915-2013	DME steel cylinder multivalve for vehicle		2013-09-01
508	QC/T 916-2013	Specifications for mono-fuel DME engines of heavy-duty vehicles		2013-09-01
509	QC/T 917-2013	Manual valve for gas vehicle		2013-09-01
510	QC/T 918-2013	Test methods of petrol filter for automobiles		2013-09-01
511	QC/T 48-2013	Specifications of petrol filter assembly for automotive engines with electronically controlled petrol injection system	QC/T 48-1992	2013-09-01
512	QC/T 919-2013	Test methods of luboil for automobiles		2013-09-01
513	QC/T 920-2013	Specifications of full-flow luboil filter assembly for automobiles		2013-09-01
514	QC/T 921-2013	Specification and test methods of by-pass centrifugal luboil filters for automobiles		2013-09-01
515	QC/T 922-2013	Specifications of paper element for automobile air filters		2013-09-01
516	QC/T 923-2013	Specifications of fuel prefilter assembly for automotive diesels		2013-09-01
517	QC/T 287-2013	Dimensions of fuel filter paper element for vehicles	QC/T 287-1999	2013-09-01
518	QC/T 625-2013	Metallic coatings and conversion coatings for automobile	QC/T 625-1999	2013-09-01
519	QC/T 721-2013	Non-electrolytically applied zinc flake coatings for automobile	QC/T 721-2004	2013-09-01
520	QC/T 927-2013	Flange coupling connectors		2013-09-01
521	QC/T 518-2013	Tightening torque for automotive threaded fasteners	QC/T 518-2007	2013-09-01
522	QC/T 401-2013	24° cone connectors - Male elbow - Body	QC/T 401-1999	2013-09-01
523	QC/T 369-2013	Pipe clips - Fasten multipipe	QC/T 369-1999	2013-09-01
524	QC/T 370-2013	Pipe clips - Fasten one pipe	QC/T 370-1999	2013-09-01

525	QC/T 621.1-2013	Spring band hose clamps – Part 1: Types, dimensions, materials	QC/T 621-1999	2013-09-01
526	QC/T 621.2-2013	Spring band hose clamps – Part 2: Technical requirements		2013-09-01
527	QC/T 621.3-2013	Spring band hose clamps – Part 3: Hose and spigot for clamps		2013-09-01
528	QC/T 624-2013	Rubber plugs	QC/T 624-1999	2013-09-01
529	QC/T 378-2013	Hexagon countersunk headless cone plugs	QC/T 378-1999	2013-09-01
530	QC/T 400-2013	24° cone connectors - Male run tee - Body	QC/T 400-1999	2013-09-01
531	QC/T 405-2013	Flared couplings-Male branch tee - Body	QC/T 405-1999	2013-09-01
532	QC/T 928-2013	Plastic cable and tubing clips with interfix hole		2013-09-01
533	QC/T 929-2013	Plastic cable and tubing clips with side - fix hole		2013-09-01
534	QC/T 930-2013	Corrugated pipe protectors		2013-09-01
535	QC/T 931-2013	Heavy duty hose clamps		2013-09-01
536	QC/T 599-2013	Overhead projection weld bolts	QC/T 599-1999	2013-09-01
537	QC/T 403-2013	Flared couplings – Male - Body	QC/T 403-1999	2013-09-01
538	QC/T 379-2013	Square head cone plugs	QC/T 379-1999	2013-09-01
539	QC/T 404-2013	Flared couplings - Male elbow - Body	QC/T 404-1999	2013-09-01
540	QC/T 381-2013	Hexagon outside head cone plugs	QC/T 381-1999	2013-09-01
541	QC/T 618-2013	Specification for plastic expansion nut	QC/T 618-1999	2013-09-01
542	QC/T 383-2013	Hexagon outside head cone plugs with magnetic core	QC/T 383-1999	2013-09-01
543	QC/T 399-2013	24° cone connectors – Male - Body	QC/T 399-1999	2013-09-01
544	QC/T 402-2013	24° cone connector s- Male branch tee - Body	QC/T 402-1999	
545	QC/T 925-2013	Ultra capacitor electric city bus - Engineering approval evaluation program		2013-09-01
546	QC/T 926-2013	The reliability test methods for power train unit of light-duty hybrid electric vehicles (ISG type)		2013-09-01

Foreword

This Standard is drafted according to rules given in GB/T 1.1-2009.

This Standard replaces QC/T 625-1999 "Metallic coatings and conversion coatings for automobile". Compared with QC/T 625-1999, the main technical amendments are as follows:

- adjusted the representation of metallic coatings and conversion coatings for automobile (see Clause 3 of this edition);
- modified the requirements for conversion coatings for post-treatment of electroplated coatings of zinc (see Sub-clause 5.2 of this edition);
- added the provisions for electroplated coatings of zinc-nickel alloy, electroplated coatings of zinc-iron alloy as well as zinc and aluminum coatings (see Clause 16, Clause 17 and Sub-clause 19.2 of this edition);
- deleted the provisions for electroplated coatings of lead and electroplated coatings of cadmium on steel (see Clause 8 and Clause 16 of 1999 edition).

This Standard was proposed by and shall be under the jurisdiction of China National Technical Committee on Auto Standardization (SAC/TC 114).

The drafting organization of this Standard: China FAW Group Corporation R&D Center.

Main drafter of this Standard: Wei Xiaochuan.

This Standard replaces the following previous standards:

- QC/T 625-1999;
- ZB T 04004-1988;
- JB 2864-1981.

Metallic coatings and conversion coating for automobile

1 Scope

This Standard specifies the requirements, technical specification and test methods for metallic coatings and conversion coatings of parts and accessories of automobile.

This Standard is applicable to automobile design and process design.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 4340.1 *Metallic materials-Vickers hardness test – Part 1: Test method* (GB/T 4340.1-2009, ISO 6507-1:2005, MOD)

GB/T 4955 *Metallic coatings - Measurement of coating thickness - Coulometric method by anodic dissolution* (GB/T 4955-2005, ISO 2177:2003 IDT)

GB/T 4956 *Non-magnetic coatings on magnetic substrates - Measurement of coating thickness - Magnetic method* (GB/T 4956-2003, ISO 2178:1982, IDT)

GB/T 4957 *Non-conductive coatings on non-magnetic basis metals - Measurement of coating thickness - Eddy current* (GB/T 4957-2003, ISO 2360:1982, IDT)

GB/T 5267.1 *Fasteners-electroplated coatings* (GB/T 5267.1-2002, ISO 4042:1999, IDT)

GB/T 5270 *Metallic coatings on metallic substrates - Electrodeposited and chemically deposited coatings - Review of methods available for testing adhesion* (GB/T 5270-2005, ISO 2819:1980, IDT)

GB/T 6461 *Methods for corrosion testing of metallic and other inorganic coatings on metallic substrates - Rating of test specimens and manufactured articles subjected to corrosion tests* (GB/T 6461-2002, ISO 10289:1999, IDT)

GB/T 8013.1 *Anodic oxide coatings and organic polymer coatings on aluminum and its alloys – Part 1: Anodic oxide coatings*

GB/T 8014.2 *Anodizing of aluminum and its alloys -The measuring method of thickness of anodic oxide coatings - Part 2: Mass-loss method*

GB/T 9797 *Metallic coatings - Electroplated coatings of nickel plus chromium and of copper plus nickel plus chromium (GB/T 9797-2005, ISO 1456:2003, IDT)*

GB/T 9798 *Metallic coatings - Electrodeposited coatings of nickel (GB/T 9798-2005, ISO 1458:2002, IDT)*

GB/T 9799 *Metallic coatings - Electroplated coatings of zinc on iron or steel (GB/T 9799-1997, eqv ISO 2081:1986)*

GB/T 9800 *Chromate conversion coatings on electroplated zinc and cadmium coatings (GB/T 9800-1988, eqv ISO 4520:1981)*

GB/T 10125 *Corrosion tests in artificial atmosphere - Salt spray tests (GB/T 10125-1997, eqv ISO 9227:1990)*

GB/T 11376 *Phosphate conversion coatings for metals (GB/T 11376-1997, eqv ISO 9717:1990)*

GB/T 11379 *Metallic coatings - Electroplated coatings of chromium for engineering purposes (GB/T 11379-2008, ISO 6158:2004, IDT)*

GB/T 12333 *Metallic coatings - Electroplated coatings of copper for engineering purpose*

GB/T 12599 *Metallic coatings - Electroplated coatings of tin - Specification and test methods (GB/T 12599-2002, ISO 2093:1986, MOD)*

GB/T 12600 *Metallic coatings - Electroplated coatings of nickel plus chromium on plastics materials (GB/T 12600-2005, ISO 4252:2003, IDT)*

GB/T 12967.3 *Test methods for anodic oxidation coatings of aluminum and aluminum alloys - Part 3: Copper accelerated acetic acid salt spray test (CASS test) (GB/T 12967.3-2008, ISO 9227:2006, MOD)*

GB/T 13912 *Metallic coatings-Hot dip galvanized coatings on fabricated iron and steel articles - Specification and test methods (GB/T 13912-2002, ISO 1461:1999, MOD)*

GB/T 15519 *Chemical conversion coatings - Black oxide coating on iron and steel - Specification and test methods*

^b "xx" represents coatings thickness.

6.2 Property test of electroplated coatings of tin

Test shall be carried out for thickness and adhesion of electroplated coatings of tin. Test methods are in accordance with provisions of GB/T 12599. If necessary, manufacturer and customer can negotiate to carry out test for other properties.

7 Electroplated coatings of silver

7.1 Grading code and application condition of electroplated coatings of silver are shown in Table 8.

Table 8 Grading code and application condition of electroplated coatings of silver

Substrate material	Grading code	Thickness, μm	Application condition and example
Copper	Cu/Ag6·At	≥ 6	Environment with high service temperature and high current, such as electric devices of automobile

7.2 Property test of electroplated coatings of silver

Test shall be carried out for thickness and adhesion of electroplated coatings of silver. Test methods are in accordance with provisions of SJ/T 11111 and SJ/T 11112. If necessary, manufacturer and customer can negotiate to carry out test for other properties.

8 Electroplated coatings of copper

8.1 Grading code and application condition of electroplated coatings of copper are shown in Table 9.

8.2 Property test of electroplated coatings of copper

Test shall be carried out for thickness, porosity and adhesion of electroplated coatings of silver. Test methods are in accordance with provisions of GB/T 12333. If necessary, manufacturer and customer can negotiate to carry out test for other properties.

				properties is required, such as steel strip ring
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NOTE 1: When spongy chromium plating is carried out, type and depth of pore shall be indicated. After electrochromism, thermal treatment must be carried out to remove hydrogen embrittlement and the thermal treatment condition is in accordance with provisions of GB/T 11379.

NOTE 2: "××" represents coating thickness.

10.2 Property test of electroplated coatings of chromium

Test shall be carried out for thickness and adhesion of electroplated coatings of chromium. Test methods are in accordance with provisions of GB/T 11379. If necessary, manufacturer and customer can negotiate to carry out test for other properties.

11 Electrochemical oxidation coatings of aluminum and aluminum alloy

11.1 Properties and application condition of electrochemical oxidation coatings of aluminum and aluminum alloy are shown in Table 12.

Table 12 Properties and application condition of electrochemical oxidation coatings of aluminum and aluminum alloy

Grading code	Thickness μm	Hardness HV	Copper accelerated acetic acid salt spray resistance		Application condition and example
			CASS test duration, h	Protection class	
Al/Et-A	≥ 10	-	24	In accordance with GB/T 12967.3	Surface decoration, such as trim strip
Al/Et-Ahd	30~50	≥ 350	-	-	It is wear-proof, such as piston

11.2 Property test of electrochemical oxidation coating of aluminum and aluminum alloy

The properties specified in table 12 shall be tested. Test methods are in accordance with provisions of GB/T 4340.1, GB/T 4957, GB/T 8013.1, GB/T 8014.2 and GB/T 12967.3. If necessary, manufacturer and customer can negotiate to carry out test for other properties.

12 Electroless nickel coatings

12.1 Properties and application condition of electroless nickel coatings are shown in table 13.

Table 15.

Table 15 Salt spray resistance of conversion coatings of steel parts

Category of conversion coatings		Grading code	Neutral salt spray resistance	
			NSS test duration, h	Grading criterion
Oxidation		Fe/Ct·0f	2	No corrosive of substrate
Phosphating	Running-in phosphating	Fe/Ct·MePhg××f	8	
	Anti-corrosion phosphating	Fe/Ct·MePhr××f	8 (16, 24)	
	Electrical insulation phosphating	Fe/Ct·MePhi××	-	-

NOTE: Choose NSS test duration of anti-corrosion phosphating according to requirement.

13.3 Property test of conversion coatings of steel parts

Manufacturer and customer can negotiate to carry out test for properties of conversion coatings of steel parts. Test methods are in accordance with provisions of GB/T 11376 and GB/T 15519.

14 Passivated coatings of zinc alloy

14.1 Properties and application condition of passivated coatings of zinc alloy is listed in Table 16.

Table 16 Properties and application condition of passivated coatings of zinc alloy

Substrate material	Grading code	Neutral salt spray resistance		Application condition and example
		NSS test duration, h	Grading criterion	
Zinc alloy	Zn/Ct·P	72	No white corrosive on main surface	Wear-proof and corrosion-resisting parts

14.2 Property test of passivated coatings of zinc alloy

Neutral salt spray resistance test shall be carried out for passivated coatings of zinc alloy. Test methods are in accordance with provisions of GB/T 10125 and GB/T 6461.

15 Electroplated coatings of lead-tin alloy

15.1 Properties and application condition of electroplated coatings of lead-tin alloy are listed in Table 17.

	720	No corrosive of substrate after specified test	
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NOTE: Corrosion resistance test shall be carried out after aging for 24h at 100°C.

17 Electroplated coatings of zinc-iron alloy

17.1 Grading code and application condition of electroplated coatings of zinc-iron alloy are shown in Table 20.

Table 20 Grading code and application condition of electroplated coatings of zinc-iron

Grading code	Application condition and example
Fe/Zn-Fe \times ·C	Seriously corrosive service condition, parts of automotive chassis etc.
Fe/Zn-Fe \times ·E	

NOTE: " \times " represents thickness and coatings thickness is 8 μ m~25 μ m. Coatings thickness of threaded fasteners shall fulfill requirements of engagement.

17.2 Properties requirements for chromate conversion coatings on surface of electroplated coatings of zinc-iron are shown in Table 21.

Table 21 Salt spray resistance of chromate conversion coatings on surface of electroplated coatings of zinc-iron

Category of conversion coatings	Neutral salt spray resistance		Other properties
	NSS test duration, h	Grading criterion	
C (rainbow color, passivated without hexavalent chromium)	168	No white rust	In accordance with GB/T 9800
E (black, passivated without hexavalent chromium)	168		

NOTE: Corrosion resistance test shall be carried out after aging for 24h at 100°C.

18 Vacuum aluminum-plated coatings

18.1 Properties and application condition of vacuum aluminum-plated coatings are shown in Table 22.

Table 22 Properties and application condition of vacuum aluminum-plated coatings

Substrate material	Grading code	Coatings thickness, μ m	Application condition and example
Steel and non-metal material	Me/VD·Al	0.05~0.2	Auto lamps, trim strip, etc.

NOTE 1: Other kinds of physical methods can also be used to replace vacuum aluminum-plating, such