



BUILD ELECTRONICS BETTER

全过程标准运用，助力高质量汽车电子

Full process standard application to assist
in high-quality automotive electronics



ipc.org →

**IPC CEMAC
2023**

标准的先驱



标准是什么？



规则 Rules

通过**标准化活动**，按照规定的程序经**协商一致**制定，为各种活动或其结果提供**规则、指南或特性**，供**共同使用和重复使用**的一种文件。

Standardization, Alignment, Guidance, Public, Repeat, Documentation

智慧

Wisdom

助力

Booster

基础

Basics

标准的特点





做汽车电子 **不** 懂IPC,

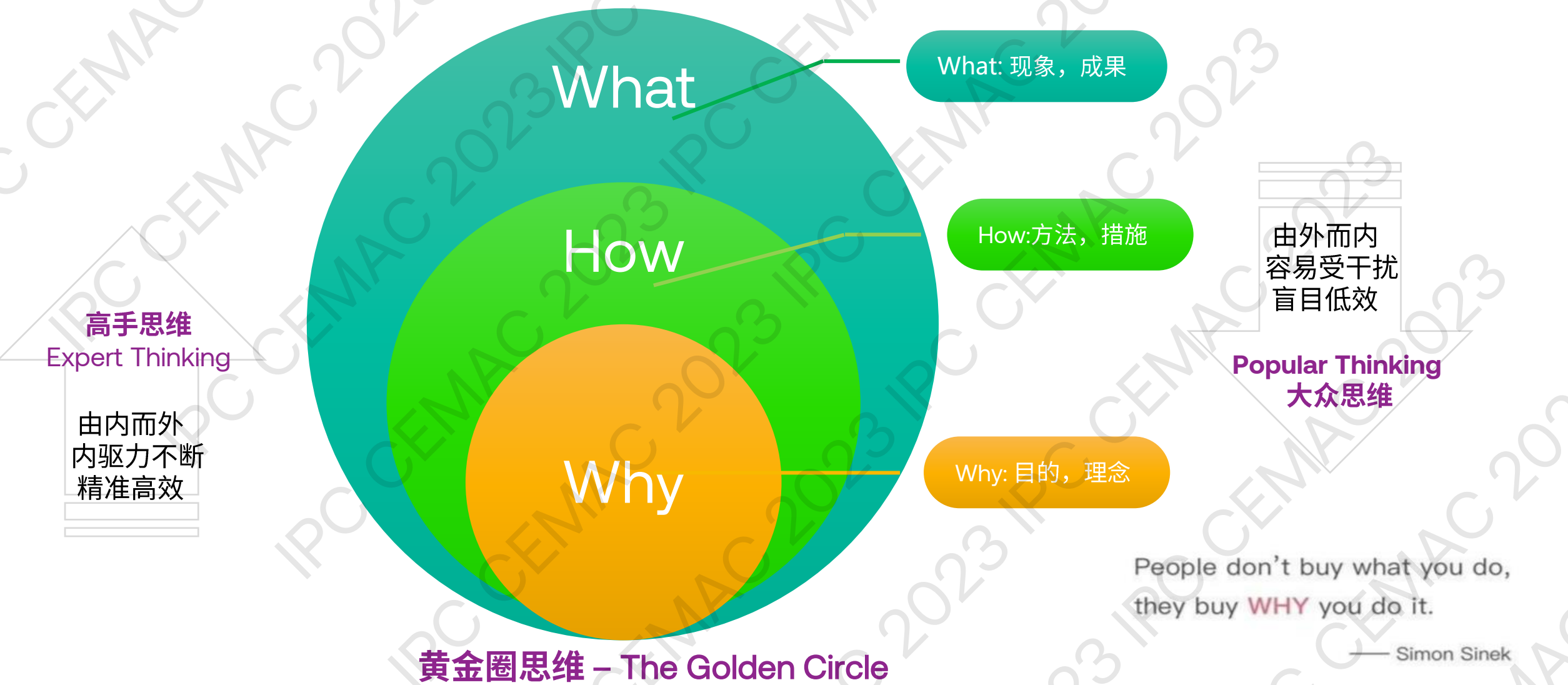
Automotive parts manufacturer don't know IPC

就好比开车上路 **不** 懂交规!

= Driver don't know traffic regulations

汽车电子陈堂主

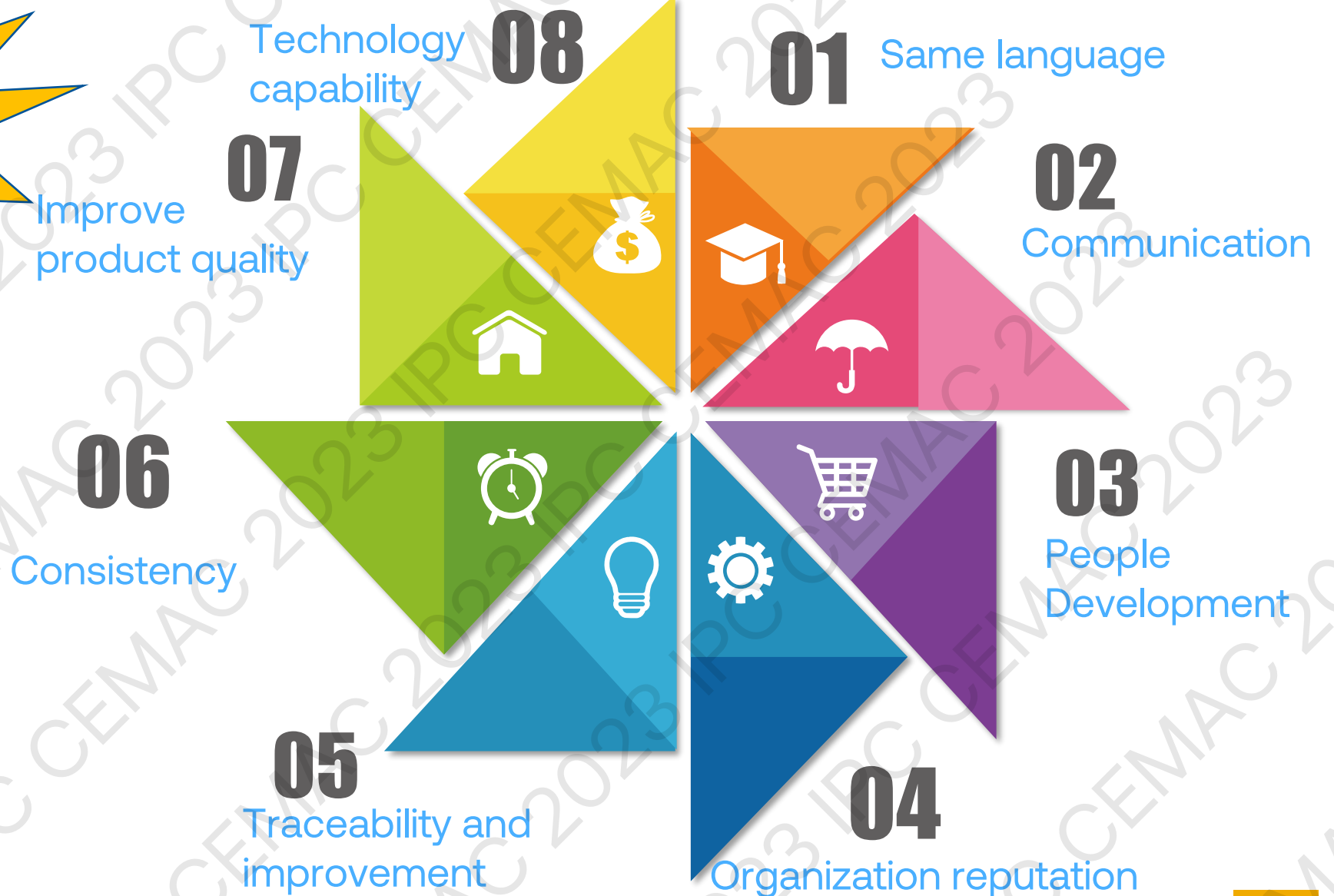
黄金圈思维 – The Golden Circle



Why 为什么要使用标准

Compliance
issue

Where is the
Value?

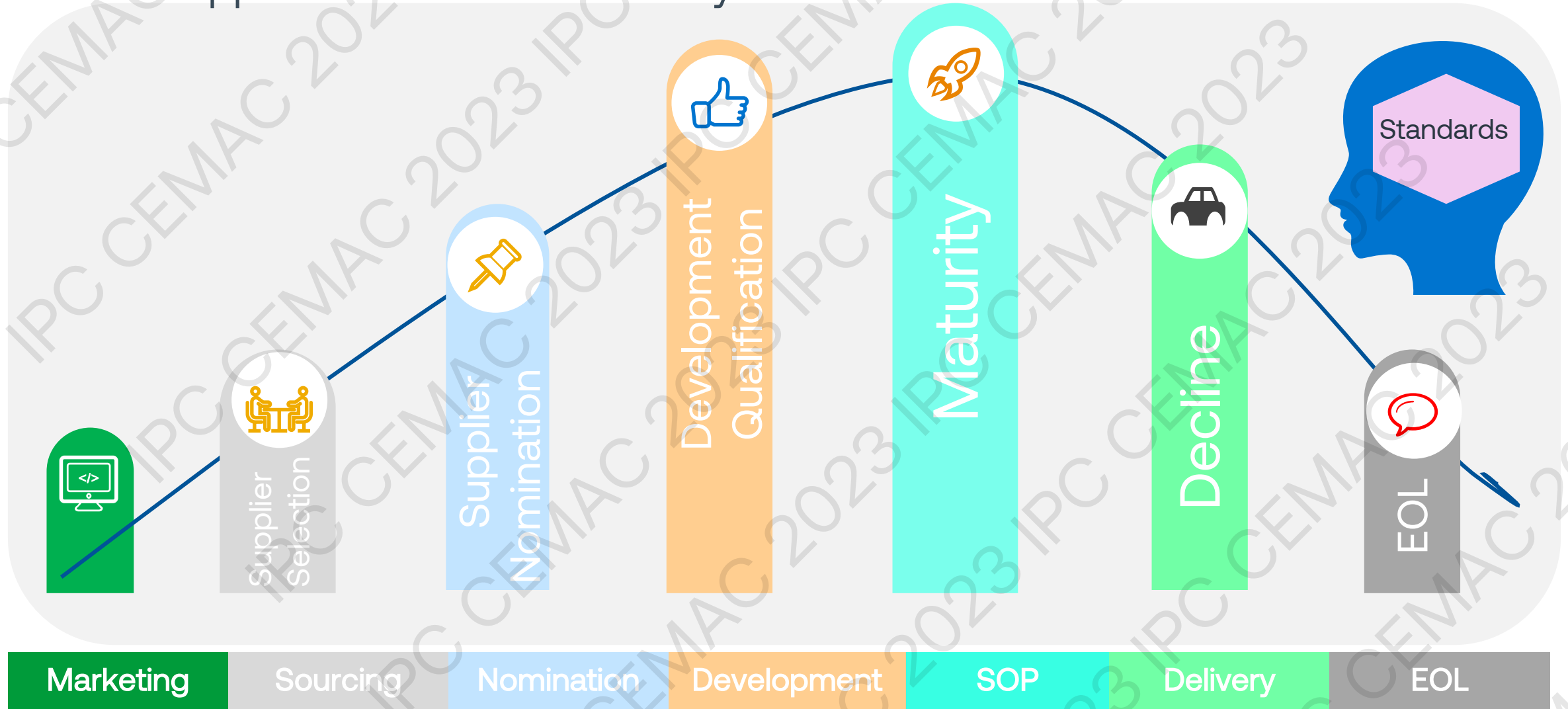


How 如何使用标准：标准使用的一般过程

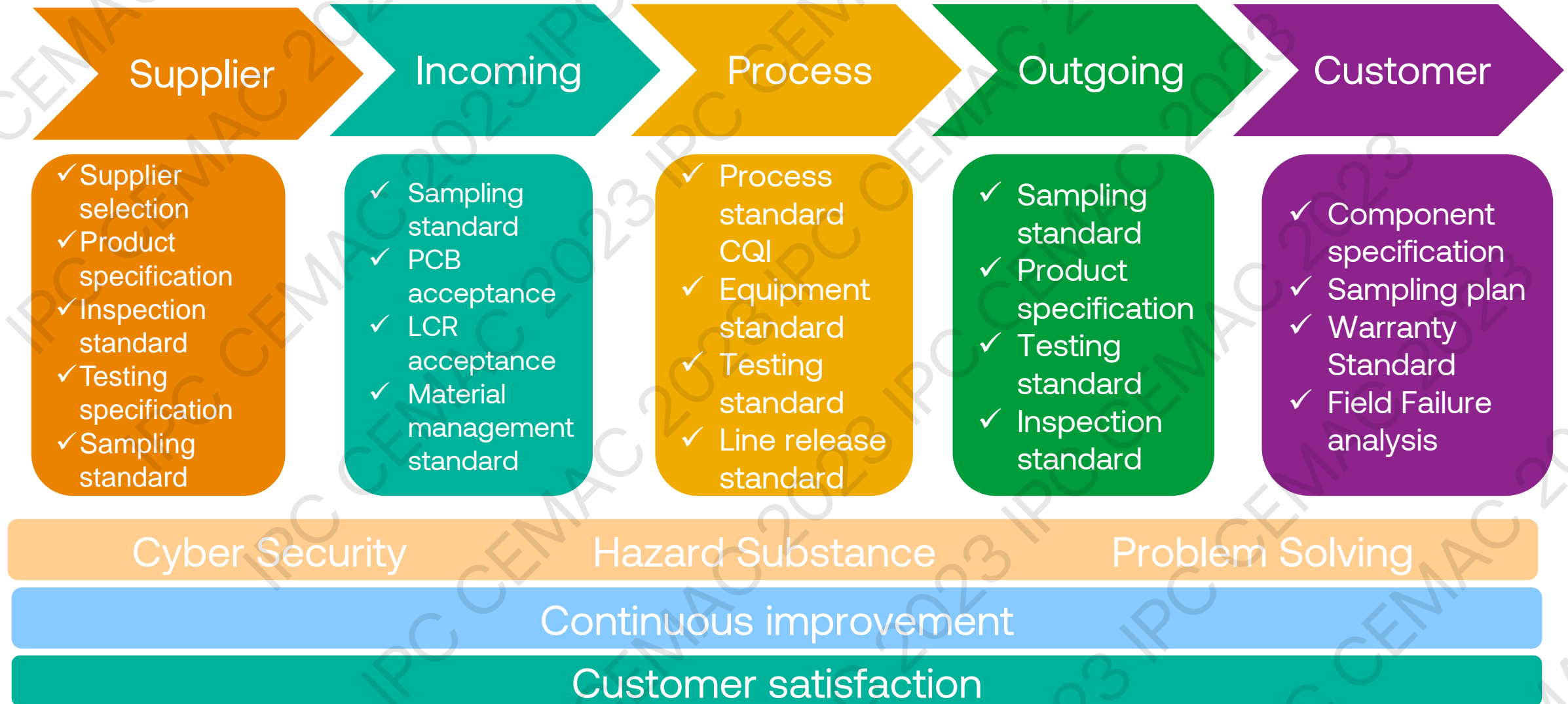


How 如何使用标准：产品标准生命周期使用

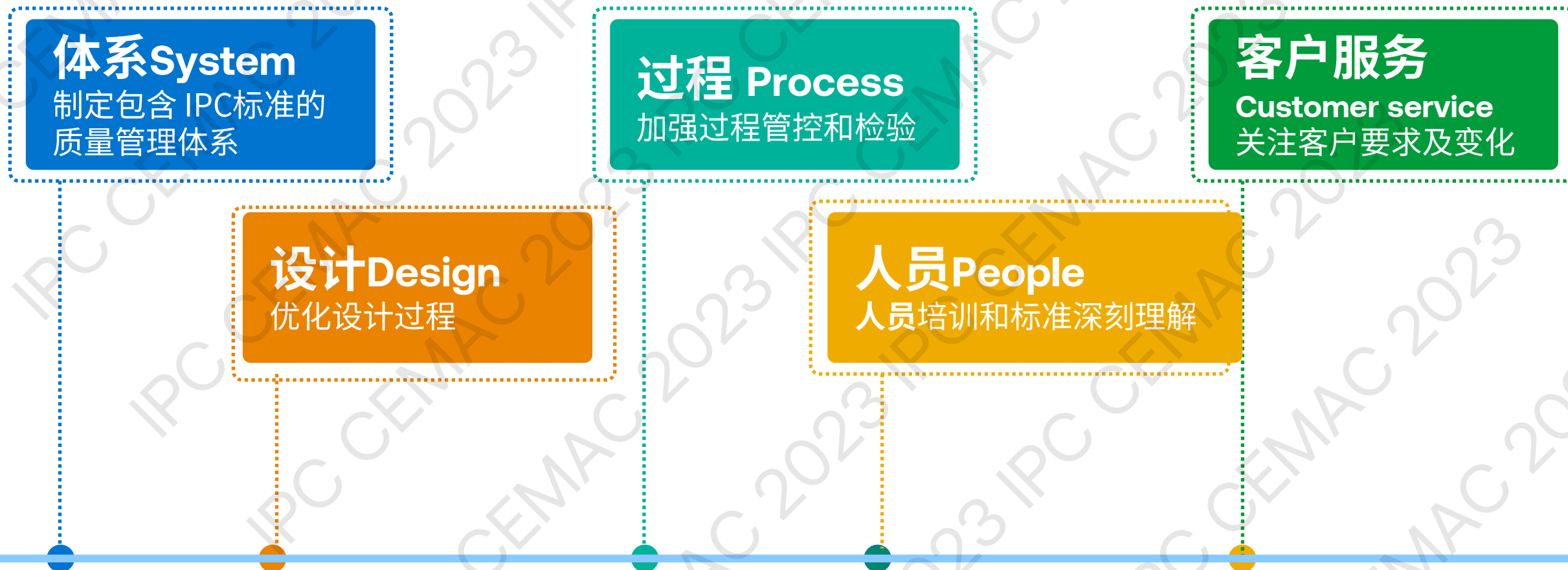
> Standard application in Product Life Cycle



How 如何使用标准：物料流标准使用



How 如何使用标准：关注要点



What: 使用哪一些IPC标准

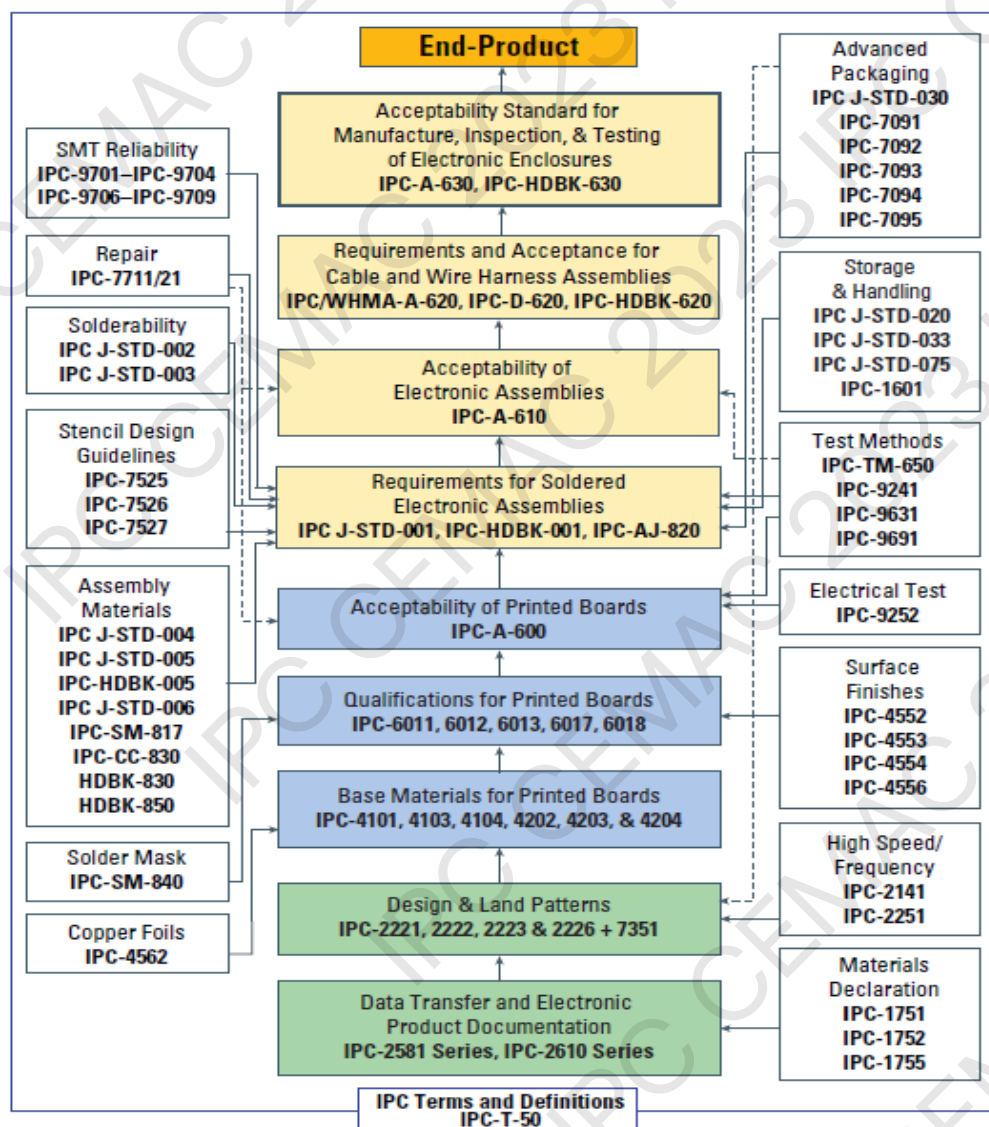


> IPC标准命名介绍

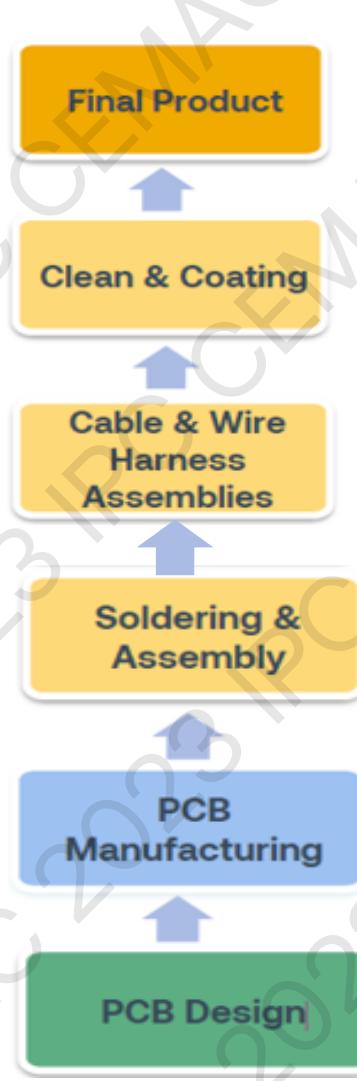
- ✓ 1. Administration ——（管理）
- ✓ 2. Engineering and Design for Electronic Packaging——（电子封装工程与设计）
- ✓ 3. Components for Electronic Packaging——（电子封装元件）
- ✓ 4. Materials for Electronic Packaging ——（电子封装材料）
- ✓ 5. Fabrication Processes for Interconnection Structures——（互联结构制造工艺）
- ✓ 6. **Types and Performance** of Interconnection Structures ——（互联结构的类型与性能）
- ✓ 7. Assembly **Processes** for Interconnection Structures——（互联结构的组装工艺）
- ✓ 8. Types and Performance of Interconnection Structure Assemblies for Electronic Packaging——（电子封装互联结构的类型与性能）
- ✓ 9. Quality and Reliability for Electronic Packaging, Fabrication and Assembly——（电子封装，制造和组装的质量和可靠性）



What: 使用哪一些标准



Learn about IPC standards at www.ipc.org/standards



Main IPC standards

IPC-A-600
Acceptability of Printed Boards

IPC-A-610
Acceptability of Electronic Assemblies

IPC/WHMA-A-620
Requirements and Acceptance for
Cable and Wire Harness Assemblies

IPC-7711/7721
Rework, Modification and Repair of
Electronic Assemblies

IPC-J-STD-001
Requirements for Soldered Electrical
and Electronic Assemblies

IPC-6012
Qualification and Performance
Specification for Rigid Printed Boards

What: 使用哪一些标准

IPC CHECKLIST for Producing Rigid Printed Board Assemblies



Checklist at the Project Start Level

E	Responsible	Demand on Assembly	IPC Standard	Information	Check
1	Project Leader	IPC Class 1, 2 or 3?	IPC-2221	Any Additional/Exceptions	
2	Project Leader	IPC Level A, B or C?	IPC-2221	Any Additional/Exceptions	
3	Project Leader	IPC Level A, B, C or D?	IPC-1752	Material Declaration	
4	Project Leader	RoHS 1 or RoHS 2?			
5	Project Leader	Touch up and Repair allowed?	IPC-7711/21	Valid for both printed board and printed board assembly?	
6	Project Leader	Surface finish on components?	J-STD-002	Different surfaces have different wetting. Can be of importance for achieving IPC Class 3.	
7	Project Leader	Process Sensitivity Level (PSL)	IPC-620 and IPC-675	Max Temp, Thermal gradient and H ₂ O Sensitivity.	
8	Project Leader	Surface finish on Printed Boards?	IPC-4552, IPC-4553 and IPC-4554	Different Surface Finishes have Different wetting and durability.	
9	Project Leader	MSL on components	J-STD-033	Moisture Sensitive Level of more importance for a Pb-Free process.	
10	Project Leader	Marking and Labeling of Components, printed boards and Printed boards to Identify Pb, Pb-Free and Other Attributes.	J-STD-609		
11	Project Leader	Voids?	IPC-7095	In the balls of BGA and CSP components	
12	Project Leader	UL class?		Underwriters Laboratories	
13	Project Leader	Cleaning and Conformal Coating	IPC-CH-85	See Checklist I, page 19.	
14	Electronic Designer	EMC on the printed board and components?	Needed for CE marking	Different Standards/Demands in different countries?	
15	Electronic Designer	Impedance?	IPC-2141		
16	Electronic Designer	High speed/frequency?	IPC-2251		
17	Electronic Designer	High amperes?	IPC-2152		
18	Electronic Designer	Base material properties for mechanical, electrical and thermal?	IPC-4101	All Base Material have different values for T _g , T _d , Dk and CTE.	
19	Project Leader	Cooling in- & outside printed boards?	IPC-2221		
20	Electronic Designer	Cu foil quality?	IPC-4562	Different Cu Foils in the market	
21	Electronic Designer	CAF base material?	IPC-9691	Conductive Anodic Filament	
22	Electronic Designer	Embedded in the Assembly?	IPC-7092		
23	Electronic Designer	BGA/CSP on the Assembly	IPC-7095		
24	Electronic Designer	QFN on the Assembly?	IPC-7093		
25	Electronic Designer	Flip Chip on the Assembly?	IPC-7094		
26	Electronic Designer	Minimum isolation distances between holes and tracks?	IPC-2221 and IPC-2222		
27	Electronic Designer	Final size (LxWxT)?			
28	Electronic Designer	Number of layers?	IPC-4121	Buildup of an multilayer printed board	
29	Electronic Designer	Mechanical tolerances?	IPC-2615	Mechanical Drawings Standard	
30	Electronic Designer	Assembly SMDx1, SMDx2 THT or in combination?			
31	Electronic Designer	Predestinated component placements and forbidden areas?	IPC-7351		
32	Project Leader & Electronic Designer	Documentation requests material declaration	IPC-2611, IPC-2612, IPC-2612-1, IPC-2614 and IPC-2615	If not all needed data are included, the interface between CAD and CAM at the printed board and printed board assembly supplier will be unclear.	

Checklist at the Printed Board Ordering Level

G	Responsible	Demand on Printed Board	IPC Standard	Information	Check
1	Purchasing Department	Performance according to IPC Class 1, 2, 3 or 3/A?	IPC-6011 and IPC-6012	Any Additional/Exceptions 3/A See Appendix A in 6012C See Appendix B in 6012C	
2	Purchasing Department	Base Material Properties for Mechanical, Electrical and Thermal?	IPC-4101	Must be a number like IPC-4101C/xx	
3	Purchasing Department	Impedance?	IPC-2141	Tolerances?	
4	Purchasing Department	Number of Layers?	IPC-4121	Guideline for Selecting Core Construction for Multilayer Applications	
5	Purchasing Department	CAF Base Material?	IPC-9691	Conductive Anodic Filament	
6	Purchasing Department	Surface Finish?	IPC-4552, IPC-4553, IPC-4554 and IPC-4556	Different Surface Finishes have different wetting and durability.	
7	Purchasing Department	Mechanical Tolerances?	IPC-2615	Mechanical Drawings Standard	
8	Purchasing Department and CAD	Are all needed data for printed board manufacturing included?	IPC-2611, IPC-2612, IPC-2612-1 and IPC-2614	If not all needed data are included, the interface between CAD and CAM at the printed board supplier will be unclear.	
9	Purchasing Department Plus at the delivery department at the printed board fabricator	Acceptability of printed board according to IPC Class 1, 2 or 3?	IPC-6011, IPC-6012 and IPC-A-600	Does the operators have valid IPC-A-600 CIS and/or CIT Training and Certification?	
10	Purchasing Department	Solderability of printed board	J-STD-003	The wetting of the printed board is essential for achieving the perfect solder joint.	
11	Purchasing Department	Are the Printed boards clean and dry?	IPC-6012, IPC-A-600 and IPC-5703	See Checklist I, page 19.	
12	Purchasing Department	Printed Board Handling and Storage?	IPC-1601		
13	Incoming department at the printed board assembly operation	Acceptability of printed board according to IPC Class 1, 2 or 3?	IPC-A-600	IPC-A-600 CIS and CIT Training and Certification. Routines for studying and saving printed board protocols and micro sections.	

Checklist at Printed Board Assembly Ordering Level

H	Responsible	Demand on Printed board assembly	IPC Standard	Information	Check
1	Purchasing Department	Performance according to IPC Class 1, 2 or 3?	J-STD-001	Does responsible staff have valid J-STD-001 CIS and/or CIT Training and Certification?	
2	Purchasing Department	Requirements for Soldered Electronic Assemblies	J-STD-001, IPC-HDBK-001	Which requirements are valid/demanded for article X? Handbook available!	
3	Purchasing Department	ESD Demands?	IPC ESD Certification found in IPC EDGE IEC-61340C/ANSI 20.20	Does the EMS/OEM have a ESD plan, control routines and education to fulfill the necessary ESD level?	
4	Purchasing Department	MSL on components in the factory?	J-STD-033, J-STD-020 and J-STD-075	Demands for Moisture Sensitive Level? Shall printed board also be included?	
5	Purchasing Department	Solderability Tests on Component Terminations	J-STD-002	Not all Surfaces Finishes have the same wetting.	
6	Purchasing Department	Solderability of printed board	J-STD-003, IPC-1601	The wetting of the printed board is essential for achieving the perfect solder joint.	
7	Purchasing Department	Flux, Paste, Solder	J-STD-004, J-STD-005, J-STD-006	Choices of this parameters have influence for the solder joint and cleaning	
8	Purchasing Department	Type of Stencil?	IPC-7525	Fluxobloc Coatings?	
9	Purchasing Department	Stencil Printing Tolerances?	IPC-7527	SPI Parameters	
10	Purchasing Department	Stencil and Misprinted Board Cleaning?	IPC-7526	Handbook!	
11	Purchasing Department	Moisture/Reflow Sensitivity Classification of Components	J-STD-033, J-STD-020 and J-STD-075	More important in a Pb-Free process	
12	Purchasing Department	Assembly and Joining	IPC-AJ-820	Handbook available!	
13	Purchasing Department	Acceptability of printed board assembly acc. to IPC Class 1, 2 or 3?	IPC-A-610	Does the operators have valid IPC-A-610 CIS and/or CIT Training and Certification?	
14	Purchasing Department	Rework, Modifications and Repair of printed board and printed board assembly?	IPC-7711/21	Is it allowed to Do Touch up and Repair? Does the operators have valid IPC-7711/21 CIS and CIT Training and Certification?	
15	Purchasing Department	Cleaning and Conformal Coating?	IPC-CH-85, IPC-CC-830, IPC-HDBK-830, IPC-9505	Many parameters to control to get the printed board assembly clean.	
16	Purchasing Department	Cabling	IPC-A-600	Does the operators have valid IPC-A-600 CIS	
17	Purchasing Department	Material Declaration			



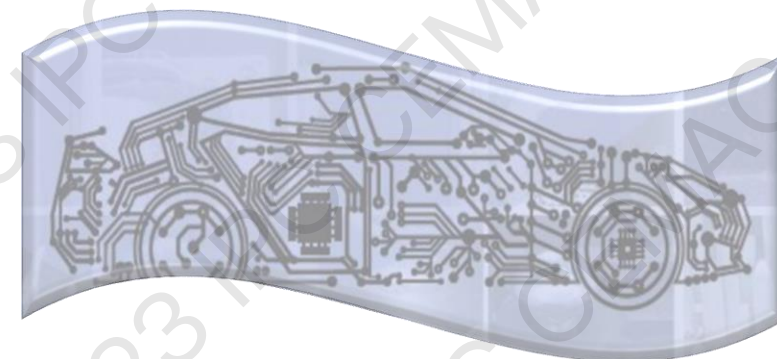
Meet Your Standards

Internationally Recognized to Build Electronics Better

What: 使用哪一些标准

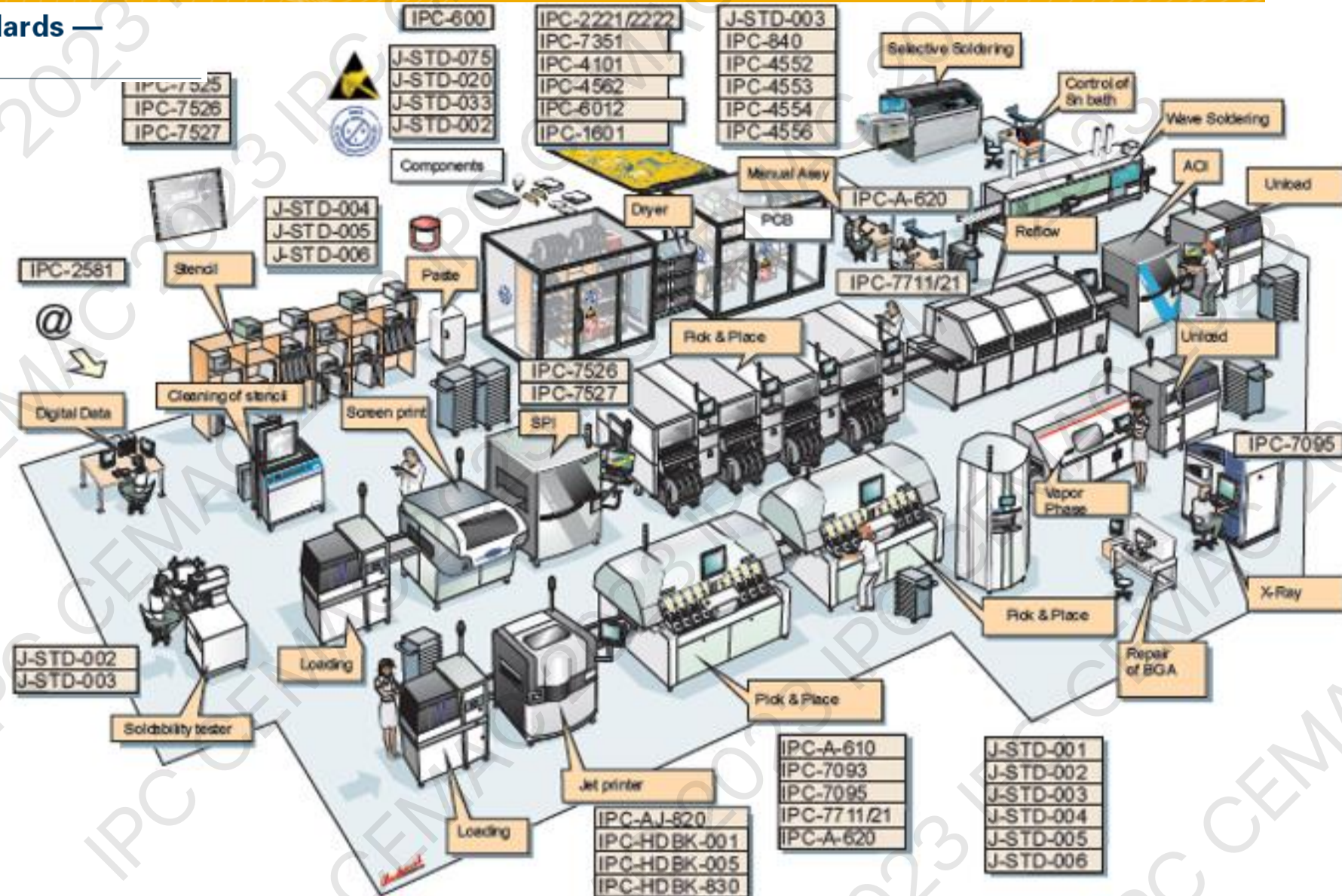
常用汽车电子行业工艺要求和质量验收标准

- > **IPC-6012-Automotive:** 《刚性印制板的鉴定及性能规范》 汽车要求补充标准
- > **IPC-A-610H-Automotive:** 《电子组件的可接受性》 汽车应用补充标准
- > **IPC-J-STD-001H-Automotive:** 《焊接的电气和电子组件要求》 汽车 应用补充标准
- > **IPC-9797:** 《符合汽车应用要求及其他高可靠性应用要求的压接标准》
- > **IPC-6921:** 封装基板的要求与验收（开发进行中）
- > **IPC-9541:** 先进封装SIP的要求与验收（开发进行中）
- > **IGBT:** 功率器件半导体
- > **EV:** 新能源汽车（计划将来开发）



What: 使用哪一些标准

PCBA Rigid with IPC Standards — Soldering and Assembly



Precautions for using the IPC standard

1. Document Revision Table | IPC Resources

IPC Document Revision Table

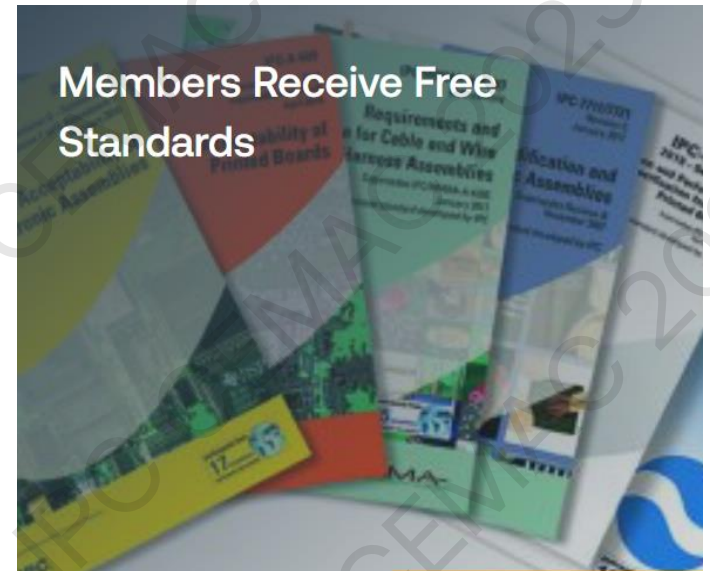
IPC has hundreds of standards, guidelines, handbooks, and tools to help you **build electronics better**.

All of IPC's current and historical documents are catalogued below. If you do not see the document that you're looking for, make sure to check the 'obsolete and superseded documents' tab at the bottom of the page.

2. Recently Released | IPC Standards

Recently Released IPC Standards and Documents

Recently Released IPC Standards and Documents



世界标准日 - 中国主题

