

## Axiom Electronics PCBA Design for Manufacturability Guidelines

Section: 10.18	Revision: B	Revision Date: 12/10/18
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DFM Subject: Via Plugging and Filling With Soldermask
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### **Hole (via) Protection Types per IPC-4761**

#### **Type I – Tented:**

Dry film solder mask over the hole. No other materials are added.

Not recommended due to the use of dry film solder mask.

#### **Type II – Tented and Covered:**

An additional dry film or liquid solder mask layer covers the Type I tented hole.

Not recommended due to the use of dry film solder mask.

#### **Type III – Plugged:**

A non-conductive material partially fills the hole but does not go all the way through.

Single-sided: not recommended due to the possibility of chemical entrapment.

Double-sided: generally not recommended due to the possibility of chemical entrapment.

#### **Type IV – Plugged and Covered:**

An additional dry film or liquid solder mask layer covers the Type III plugged hole.

Single-sided: not recommended due to the possibility of chemical entrapment.

Double-sided: generally acceptable because the possibility of chemical entrapment is low.

#### **Type V – Filled:**

A conductive or non-conductive material completely fills the hole.

Single and double-sided: recommended method.

#### **Type VI – Filled and Covered:**

An additional dry film or liquid solder mask layer covers the Type V filled hole.

Single and double-sided: recommended method with LPI. Not recommended with dry film.

#### **Type VII – Filled and Capped:**

A metalized coating covers the filled Type V hole.

Single and double-sided: recommended method.

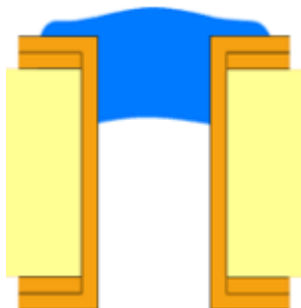
### **DFM Impact:**

Tenting, plugging and filling is generally used eliminate solder shorts during wave or selective soldering. It should only be used when necessary because it adds cost.

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### DFM Details: Tented, Plugged and Filled Hole Examples

Single Sided Tenting/Plugging is Risky Due to the Possibility of Chemical Entrapment.



Completely Filling the Hole Eliminates the Risk of Chemical Entrapment.

