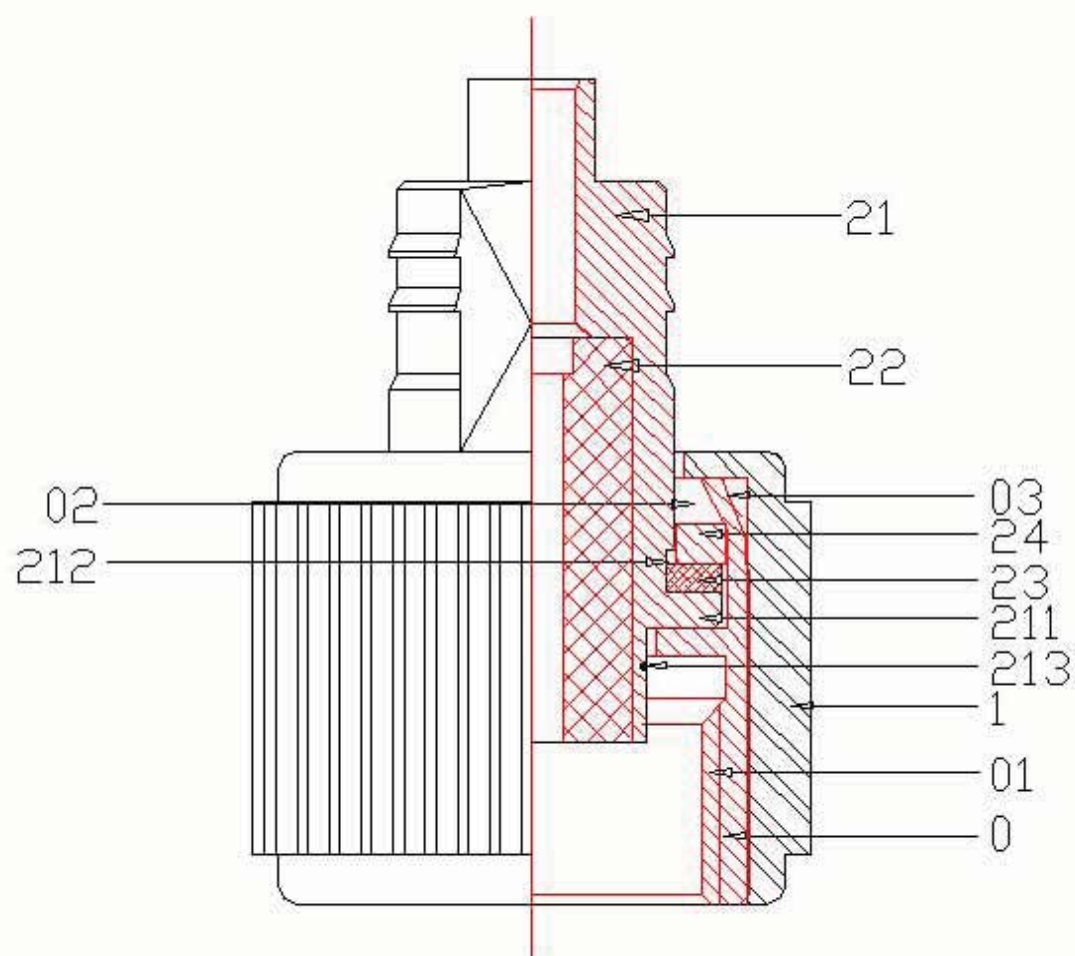


## 摘要附图



## 权 利 要 求 书

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1、天线摇杆连接器，其特征在于：它包含螺牙体(0)、壳套(1)和主体(2)；螺牙体(0)为两端透空的筒体，螺牙体(0)内侧的一端设置有螺牙(01)，螺牙体(0)设置在壳套(1)的内部，壳套(1)为两端透空的筒体，主体(2)穿设在螺牙体(0)的内部，所述的主体(2)分为外导体(21)绝缘体(22)黄铜垫圈(23)硅胶圈(24)，外导体(21)内部为中空设置，且内部设置有绝缘体(22)，绝缘体(22)通过打点(213)而固定，螺牙体(0)内侧上部设置有凹槽(02)，外导体(21)插接在凹槽(02)的内部，外导体(21)的中下部设置有凸缘(211)，凸缘(211)的上部设置有一凹槽(212)，凹槽(212)上设置有一硅胶圈(23)，硅胶圈(23)的上部设置有黄铜垫圈(24)，螺牙体(0)的上部设置有管口(03)。

2、根据权利要求1所述的天线摇杆连接器，其特征在于：所述的螺牙体(0)为铜质螺牙体。

3、根据权利要求1所述的天线摇杆连接器，其特征在于：所述的壳套(1)为塑胶壳套。

# 说明书

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## 天线摇杆连接器

### 技术领域：

本实用新型涉及天线摇杆连接器，属于无线遥感器技术领域。

### 背景技术：

如中国公告第 CN 201256178Y 号专利，提供了一种连接器，其主体部分被分割为第一段部分和第二段部分，其绝缘体要求为 T 型结构。

由该案可以发现，1. 其主体部分被分割为两段，导致产品增加了车床车制成本的产品组装成本。2. 新产品需要规避 T 型结构的绝缘体。

### 实用新型内容：

针对上述问题，本实用新型要解决的技术问题是提供天线摇杆连接器。

本实用新型的天线摇杆连接器，它包含螺牙体、壳套和主体；螺牙体为两端透空的筒体，螺牙体内侧的一端设置有螺牙，螺牙体设置在壳套的内部，壳套为两端透空的筒体，主体穿设在螺牙体的内部，所述的主体包含外导体，绝缘体，黄铜垫圈，硅胶圈，外导体的内部为中空设置，且外导体的内部设置有绝缘体，通过打点方式固定绝缘体，螺牙体内侧上部设置有凹槽，外导体插接在凹槽的内部，外导体的中下部设置有凸缘，凸缘的上部设置有一凹槽，凹槽上设置有硅胶圈，硅胶圈的上部设置有黄铜垫圈，螺牙体的上部设置有管口。

作为优选，所述的螺牙体为铜质螺牙体。

作为优选，所述的壳套为塑胶壳套。

作为优选，所述的外导体为铜质外导体或压铸锌合金外导体。

本实用新型的有益效果为：

1. 它采用外导体为一体的结构, 省去了不必要的多个产品配件的车制和不必要的产品组装, 有效降低了产品成品,

2. 绝缘体采用打点固定的结构, 规避了中国公告第 CN 201256178Y 号专利.

3. 在外导体凸缘上面增加凹槽, 有效的提高的连接品产品的扭力稳定性.

### 附图说明:

为了易于说明, 本实用新型由下述的具体实施及附图作以详细描述。

图 1 为背景技术中现有的天线摇杆连接器结构示意图,

图 2 为本实用新型的结构示意图,

图 3 为本实用新型的分解结构示意图,

图 4 为本实用新型的剖视图,

图 5 为本实用新型与转接座结合后与天线摇杆结合的立体示意图,

图 6 为本实用新型的效果示意图。

图中: 0-螺牙体; 01-螺牙; 02-凹槽; 03-管口; 1-壳套; 2-主体; 21-第一段部; 211-凸缘; 212-凹槽; 213-打固定点; 22-绝缘体; 23-硅胶; 24-黄铜垫片; 3-转接座; 31-枢接瓣; 4-天线摇杆。

### 具体实施方式:

为使本实用新型的目的、技术方案和优点更加清楚明了, 下面通过附图中示出的具体实施例来描述本实用新型。但是应该理解, 这些描述只是示例性的, 而并非要限制本实用新型的范围。此外, 在以下说明中, 省略了对公知结构和技术的描述, 以避免不必要地混淆本实用新型的概念。

如图 1-4 所示, 本具体实施方式采用以下技术方案: 它包含螺牙体 0、壳套 1 和主体 2; 螺牙体 0 为两端透空的筒体, 螺牙体 0 内侧的一端设置

有螺牙 01，螺牙体 0 设置在壳套 1 的内部，壳套 1 为两端透空的筒体，主体 2 穿设在螺牙体 0 的内部，所述的主体(2)分为外导体(21)绝缘体(22)黄铜垫圈(23)硅胶圈(24)，外导体(21)内部为中空设置，且内部设置有绝缘体(22)，绝缘体(22)通过打点(213)而固定，螺牙体(0)内侧上部设置有凹槽(02)，外导体(21)插接在凹槽(02)的内部，外导体(21)的中下部设置有凸缘(211)，凸缘(211)的上部设置有一凹槽(212)，凹槽(212)上设置有一硅胶圈(23)，硅胶圈(23)的上部设置有黄铜垫圈(24)，螺牙体(0)的上部设置有管口(03)

进一步的，所述的螺牙体 0 为铜质螺牙体。

进一步的，所述的壳套 1 为塑胶壳套。

进一步的，所述的外导体为铜质外导体或压铸锌合金外导体

本具体实施方式中螺牙体 0 朝向穿设主体 2 的方向，设有凹槽 02，且该凹槽 02 允许该外导体 21 插入，且该外导体 21 的中下段设有一凸缘 211，在该第一段部上的凸缘 211 上面设有一凹槽 212，凹槽 212 上设有硅胶圈 23，在该硅胶圈 23 上设有一黄铜垫圈 24，通过对螺牙体管口 03 缩口固定住黄铜垫圈 24，从而固定住硅胶圈 23 和外导体 21，利用该硅胶圈 23 材质略有弹性的特点，使螺牙体 0 和壳套 1 与主体 2 间形成一定的扭力，如图 5 为本实用新型与一个转接座 3 相互套合的示意图，该转接座 3 的一端部包括二片枢接瓣 31，配合一个连接件可以令其与天线摇杆 4 结合，如图 6 为使天线使用旋转的过程中主体 2 与转接座 3 不松动。

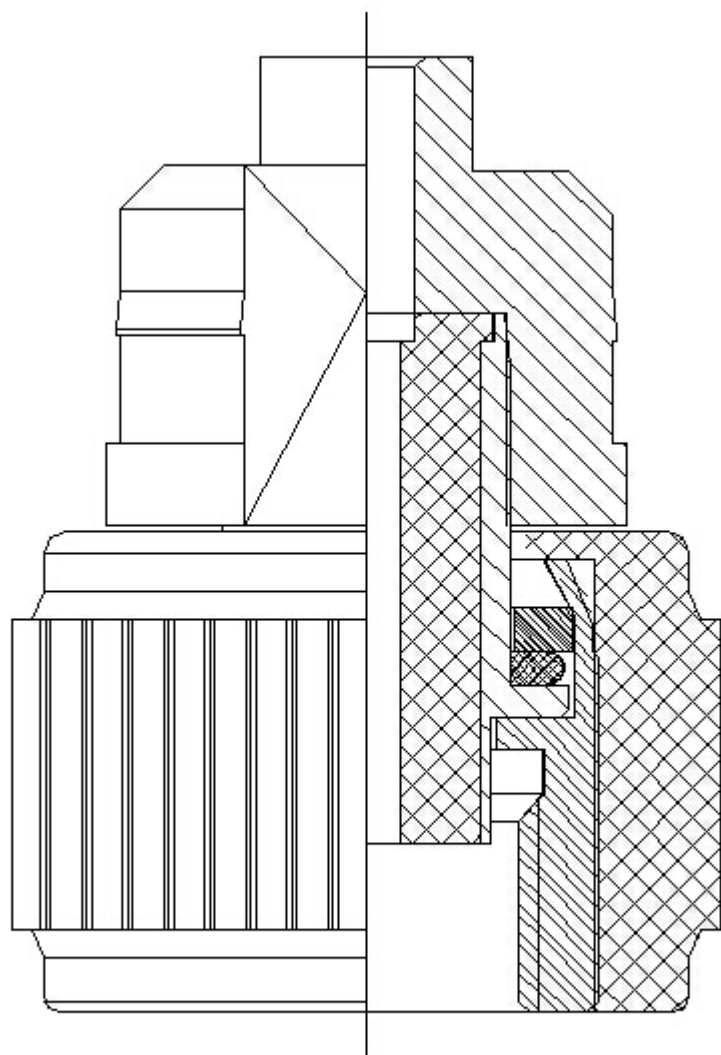
1. 它采用外导体为一体的结构，省去了不必要的多个产品配件的车制和不必要的产品组装工序，有效降低了产品成品，

2. 绝缘体采用打点固定的结构，规避了中国公告第 CN 201256178Y 号专利。

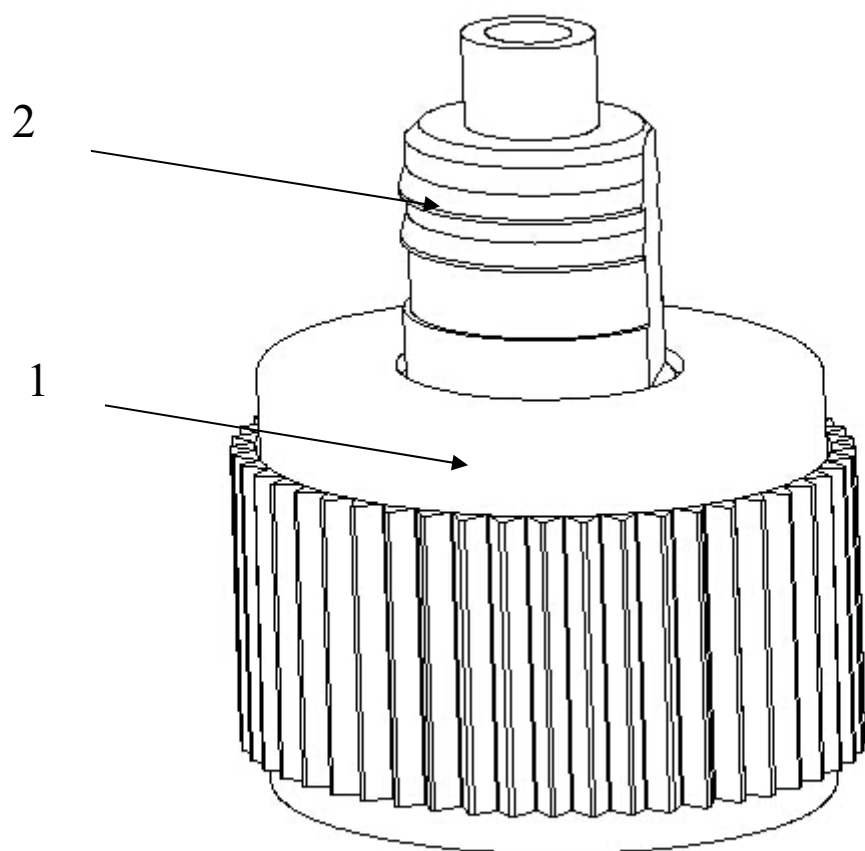
3. 在外导体凸缘上面增加凹槽，有效的提高的连接器产品的扭力稳

定性.

以上显示和描述了本实用新型的基本原理和主要特征和本实用新型的优点。本行业的技术人员应该了解，本实用新型不受上述实施例的限制，上述实施例和说明书中描述的只是说明本实用新型的原理，在不脱离本实用新型精神和范围的前提下，本实用新型还会有各种变化和改进，这些变化和改进都落入要求保护的本实用新型范围内。本实用新型要求保护范围由所附的权利要求书及其等效物界定。

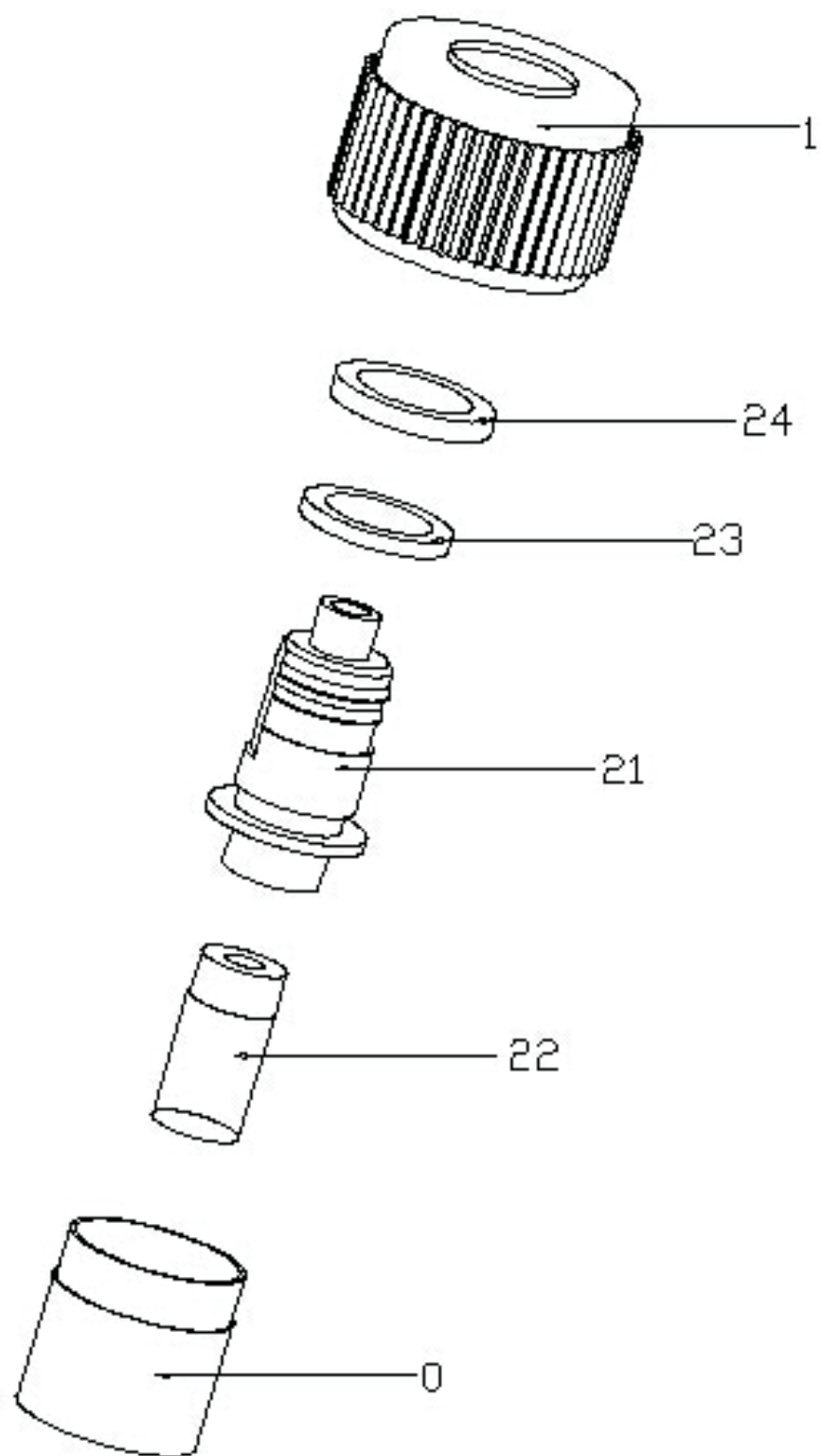


图一

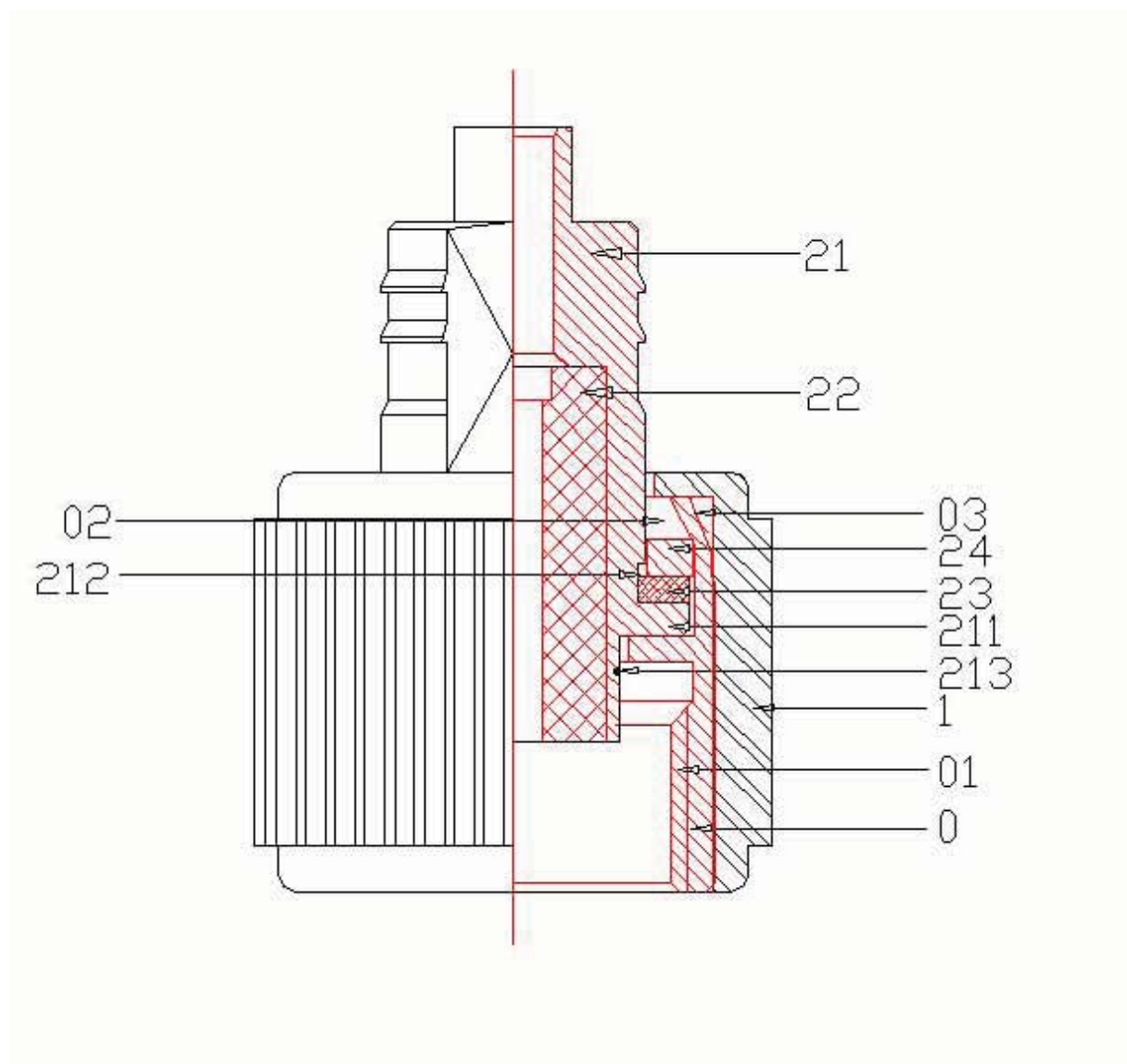


从

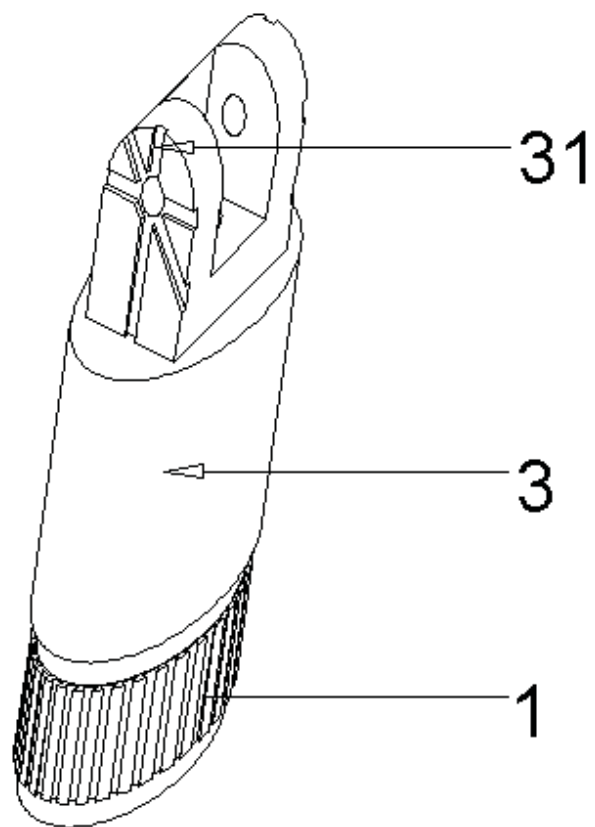
图二



图三



图四



图五

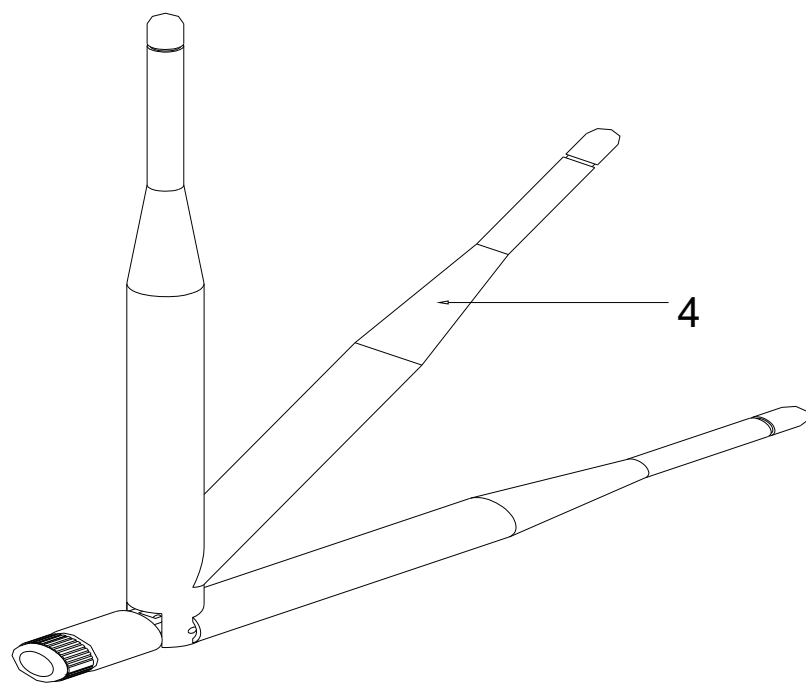


图 6



# 中华人民共和国国家知识产权局

518000



XQ26873501411

广东省深圳市福田区莲花北村宝莲大厦1栋18D

卞小磊

发文日:

2015年01月21日

2HS



申请号或专利号: 201420698027.8

发文序号: 2015011600078750

申请人或专利权人: 深圳市玉富同电子科技有限公司

发明创造名称: 天线摇杆连接器

## 办理登记手续通知书

根据专利法实施细则第54条及国家知识产权局第75号公告的规定, 申请人应当于2015年04月07日之前缴纳以下费用:

|         |         |
|---------|---------|
| 专利登记费   | 200.0 元 |
| 第1年度年费  | 600.0 元 |
| 专利证书印花税 | 5.0 元   |
| 已缴费用    | 0 元     |
| 应缴费用    | 805.0 元 |

无费减 (减缓标记)

申请人按期缴纳上述费用的, 国家知识产权局将在专利登记簿上登记专利权的授予, 颁发专利证书, 并予以公告。专利权自公告之日起生效。

申请人期满未缴纳或者未缴足上述费用的, 视为放弃取得专利权的权利。

提示:

费用可以直接到国家知识产权局缴纳, 也可以通过邮局或者银行汇付。如通过邮局汇付, 收款人姓名: 国家知识产权局专利局收费处; 商户客户号: 110000860。如通过银行汇付, 开户银行: 中信银行北京知春路支行; 户名: 中华人民共和国国家知识产权局专利局; 账号: 7111710182600166032。

汇款时应当准确写明申请号、费用名称 (或简称) 及分项金额。未写明申请号和费用名称 (或简称) 的视为未办理缴费手续。

审查员: 姚燕

审查部门: 专利局初审及流程管理部

联系电话: 62356655



200602  
2010.4

纸件申请, 回函请寄: 100088 北京市海淀区蓟门桥西土城路6号 国家知识产权局专利局受理处  
电子申请, 应当通过电子专利申请系统以电子文件形式提交相关文件。除另有规定外, 以纸件等其他形式提交的文件视为未提交。



# 中华人民共和国国家知识产权局

518000

广东省深圳市福田区莲花北村宝莲大厦1栋18D  
卞小磊

发文日:

2015年01月21日

115



申请号或专利号: 201420698027.8

发文序号: 2014123100574370

申请人或专利权人: 深圳市玉富同电子科技有限公司

发明创造名称: 天线摇杆连接器

## 授予实用新型专利权通知书

1. 根据专利法第40条及实施细则第54条的规定, 上述实用新型申请经初步审查, 没有发现驳回理由, 现作出授予实用新型专利权的通知。

申请人收到本通知书后, 应当按照办理登记手续通知书的规定办理登记手续。

申请人办理登记手续后, 国家知识产权局作出授予实用新型专利权的决定, 颁发相应的专利证书, 同时予以登记和公告。

期满未办理登记手续的, 视为放弃取得专利权的权利。

2. 授予专利权的实用新型专利申请是以申请人于申请日 2014 年 11 月 20 日提交的文本为基础。

3. 审查员依职权修改内容为:

注: 在本通知书发出后收到的申请人主动修改的申请文件, 不予考虑。

审查员: 李光磊

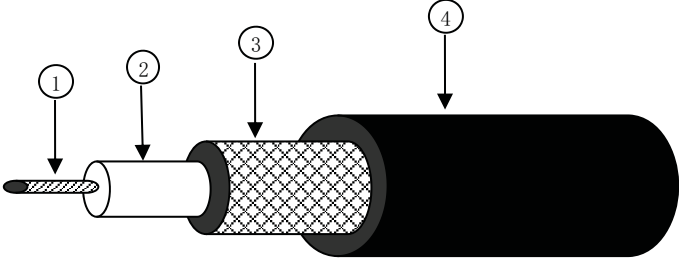
审查部门: 专利审查协作北京中心实用新型审查部

联系电话: 010-82246199

220601  
2010.2

纸件申请, 回函请寄: 100088 北京市海淀区前门桥西土城路6号 国家知识产权局专利局受理处收  
电子申请, 应当通过电子专利申请系统以电子文件形式提交相关文件。除另有规定外, 以纸件等其他形式提交的文件视为未提交。



| 电缆名称                                                                                |                                                          | RF1.13                                 |                    |
|-------------------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------|--------------------|
| 结构 Structure                                                                        | 项目 Item                                                  | 标准值 Standard value                     |                    |
| ①内导体<br>inner conductor                                                             | 材料 Material                                              | 镀锡铜丝 tinned copper wire                |                    |
|                                                                                     | 组成: 总根数/单根外径 (mm)<br>Makeup: total/O.D.ofevery wire (mm) | 7/0.08±0.003mm                         |                    |
|                                                                                     | (绞合) 标准外径 (mm)<br>(intertwist) NOM. O.D. (mm)            | 0.24±0.02mm                            |                    |
| ②绝缘层 Insulation                                                                     | 材料 Material                                              | 聚全氟乙丙烯 (FEP)                           |                    |
|                                                                                     | 颜色 colour                                                | 透明 clarity                             |                    |
|                                                                                     | 标准外径 (mm)<br>NOM. O.D. (mm)                              | 0.682±0.05mm                           |                    |
| ③外导体<br>outer conductor                                                             | 材料 Material                                              | 镀锡铜丝 tinned copper wire                |                    |
|                                                                                     | 组成: 总根数/单根外径 (mm)<br>Makeup: total/O.D.ofevery wire (mm) | 16*4/0.05                              |                    |
|                                                                                     | 标准外径 (mm)<br>NOM. O.D. (mm)                              | 0.91±0.03mm                            |                    |
|                                                                                     | 覆盖率 (%)<br>coverage ratic (%)                            | 91±5                                   |                    |
| ④护套 jacket                                                                          | 材料 Material                                              | 聚全氟乙丙烯 (FEP)                           |                    |
|                                                                                     | 颜色 colour                                                | /                                      |                    |
|                                                                                     | 标准外径 (mm)<br>NOM. O.D. (mm)                              | 1.13(+0.07mm-0.03mm)                   |                    |
| 电性能特性 Electrical characteristics                                                    |                                                          | 机械特性 mechanical properties             |                    |
| 项目 Item                                                                             | 标准值 Standard value                                       | 项目 Item                                | 标准值 Standard value |
| 1. 阻抗 Impedance                                                                     | 50±2Ω                                                    | 1. 恒定温度 steady temperature             | -55~+200℃          |
| 2. 电容 Capacitance                                                                   | 97pF/m                                                   | 2. 最小弯曲半径 minimum bending radius       | 12mm               |
| 3. 驻波比 Standing wave ratio                                                          | ≤1.3@0~6GHz                                              | 3. 最大拉伸强度 maximum tensile strength     | 0.6kg              |
| 4. 速率 Velocity                                                                      | 70%                                                      | 4. 线缆重量 Cable weight                   | 3.2g/m             |
| 5. 最大工作电压<br>Max.operating voltage                                                  | 1000V                                                    | 5. 额定温度 rated temperature              | 150℃               |
| 6. 最大工作频率<br>Max.operating frequency                                                | 6GHz                                                     | /                                      | /                  |
| 截面图                                                                                 |                                                          | 包装 Packing                             |                    |
|  |                                                          | 项目 Item                                | 标准值 Standard value |
|                                                                                     |                                                          | 包装方式<br>Packing mode                   | 纸盘<br>Papery plate |
|                                                                                     |                                                          | 每盘长度 The length of each plate          | 1000m              |
|                                                                                     |                                                          | 每盘接头数 Each connector plate number      | ≤3                 |
|                                                                                     |                                                          | 每段最短长度The shortest length of each root | ≥10                |
| 使用提示 Use tips                                                                       |                                                          |                                        |                    |
| 存储环境<br>Storage environment                                                         | 温度: 30℃以下; 湿度: 20%~65%                                   |                                        |                    |
| 最佳保存周期<br>The best save cycle                                                       | 2个月; 2个月以上作业性下降, 如上锡效果变差, 但电性能不受影响。夏季高温高湿环境开剥后需尽快流转      |                                        |                    |
| 加工温度<br>Processing temperature                                                      | 260℃的极限情况下, 可短时间承受; 300℃以上分子通常带有的等端基会分解; 400℃以上发生显著的热分解  |                                        |                    |
| 铁氟龙收缩<br>Teflon Shrink                                                              | 固有材料特性。绝缘: 0.2mm以下; 护套: 0.3mm以下                          |                                        |                    |
| 护套窜动<br>Jacket traverse                                                             | 加工长度 (护套残留长度) 低于5cm易发生                                   |                                        |                    |



## 物质安全数据表(MSDS)

### 一、物品名称与厂商资料

|           |                                         |
|-----------|-----------------------------------------|
| 物品名称      | 氟塑料电线电缆                                 |
| 物品编号      | RF0.81,RF1.13,RF1.37,RG145,RG178,RG316等 |
| 供货商名称     | 苏州市相城区正旭电线电缆有限公司                        |
| 联系地址      | 江苏省苏州市相城区阳澄湖镇岸山开发区                      |
| 紧急联络电话和传真 | TEL: 0512-65429886 FAX: 0512-65420768   |

### 二、成分辨识资料

|   | 物质名称 | 分子式                      | CAS NO     | 成分含量%  |
|---|------|--------------------------|------------|--------|
| 1 | 铜    | Cu                       | 7440-50-8  | 20~35% |
| 2 | 锡    | Sn                       | 7440-31-5  | 5~10%  |
| 3 | PTFE | (C2F4) <sub>n</sub>      | 9002-84-0  | 20~35% |
| 4 | FEP  | (C3F6·C2F4) <sub>x</sub> | 25067-11-2 | 25~35% |
| 5 | 色母   | -                        | -          | 0.5%   |
| 6 | 其它   | -                        | -          | 2%     |

### 三、危害辨识数据:

|                        |                         |
|------------------------|-------------------------|
| 危害与效应                  | 健康危害效应: 燃烧不产生酸性气体,对人体无害 |
|                        | 环境影响: 无                 |
|                        | 物理性及化学性危害: 无            |
|                        | 特殊危害: 无                 |
| 主要症状: 无                |                         |
| 危害物质分类: 本产品为固态,自然状态下无毒 |                         |

### 四、急救措施:

|                    |                         |
|--------------------|-------------------------|
| 不同暴露途径之急救方法:       | 吸入: 吸入溢出的气体, 如有不适, 立即就医 |
|                    | 皮肤接触: 无                 |
|                    | 眼睛接触: 无                 |
|                    | 食入: 如有不适, 立即就医          |
| 最重要症状及危害效应: 无      |                         |
| 对急救人员之防护: 无        |                         |
| 对医师之提示: 告知医师患者接触方式 |                         |

## 五、灭火措施:

|              |           |
|--------------|-----------|
| 适用灭火剂        | 水、二氧化碳、泡沫 |
| 灭火时可能遭遇之特殊危害 | 无         |
| 特殊灭火程序       | 移除可燃物     |
| 消防人员之特殊防护设备  | 无         |

## 六、泄漏处理方法

|        |                    |
|--------|--------------------|
| 个人注意事项 | 本品为固体,不会产生泄露,该项不适用 |
| 环境注意事项 | 本品为固体,不会产生泄露,该项不适用 |
| 清理方法   | 本品为固体,不会产生泄露,该项不适用 |

## 七、安全处置与储存方法

|    |                              |
|----|------------------------------|
| 处置 | 操作时小心烫伤                      |
| 储存 | 储存于通风良好处,避免阳光直射,避免腐蚀性液体和气体接触 |

## 八、暴露预防措施

|                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------|
| 工程控制: 无                                                                                                                             |
| 控制参数: 无                                                                                                                             |
| 个人防护设备: 口罩, 手套 <ul style="list-style-type: none"><li>• 呼吸防护: 口罩</li><li>• 手部防护: 手套</li><li>• 眼睛防护: 无</li><li>• 皮肤及身体防护: 无</li></ul> |
| 卫生措施: 保持环境清洁                                                                                                                        |

## 九、物理及化学性质

|             |         |
|-------------|---------|
| 物质状态: 固体    | 形状: 线状  |
| 颜色: 客户需求    | 气味: 无   |
| 分解温度: >250℃ | 沸点: 无   |
| PH值: 中性     | 爆炸界限: 无 |

## 十、安定性及反应性

|                    |
|--------------------|
| 安定性: 常温下极安定且具化学惰性。 |
| 特殊状况下可能之危害反应: 无    |
| 应避免之状况: 无          |
| 应避免之物质: 无          |
| 危害分解物: 无           |

## 十一、毒性资料

|            |
|------------|
| 急毒性：无      |
| 局部效应：无     |
| 致敏感性：无     |
| 慢毒性或长期毒性：无 |
| 特殊效应：无     |

## 十二、生态资料

|                                          |
|------------------------------------------|
| 可能之环境影响：<br>此项产品无法被生物分解，但可经适当之方式予以回收再利用。 |
|------------------------------------------|

## 十三、废弃处置方法

|                                 |
|---------------------------------|
| 废弃处置方法：<br>需遵守现行中央、省及地方政府之相关法规。 |
|---------------------------------|

## 十四、运送资料

|                 |
|-----------------|
| 国际运送规定：此物质无危险性。 |
| 联合国编号：无         |
| 国内运送规定：无        |
| 特殊运送方法及注意事项：无   |

## 十五、法规资料

|        |
|--------|
| 适用法规：无 |
|--------|

## 十六、其他资料

|      |                        |
|------|------------------------|
| 参考文献 | 无                      |
| 表单位  | 名 称：苏州市相城区正旭电线电缆有限公司   |
|      | 地 址：江苏省苏州市相城区阳澄湖镇岸山开发区 |
|      | 电 话：0512-65429886      |
| 制表人  | 赵正刚                    |
| 制表日期 | 2015-7-1               |



July 01, 2014

To: JIANHUA FENG  
SUZHOU XIANGCHENG ZHENGXU WIRES AND CABLES CO LTD  
Email: zzg@zhxdz.com

Subject: Follow-Up Testing Completed - Conforming Results  
Sample Tag #: F133608, 11149  
File #: E365708, Vol. #: 1  
CCN: AVL2, Appliance wiring material - component

Dear Sir / Madam:

**Please Note: This letter is automatically sent when sample tag is completed with Conforming results.**

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

The Follow-Up Services Testing has been completed on the Appliance wiring material - component, 11149 selected by our UL Representative at your SUZHOU XIANGCHENG ZHENGXU WIRES AND CABLES CO LTD, SUZHOU JIANGSU, China factory on May 15, 2014.

Please see below an itemized list of test(s) performed under the above referenced Tag.

HORIZONTAL-SPECIMEN APPLIANCE-WIRE FLAME TEST

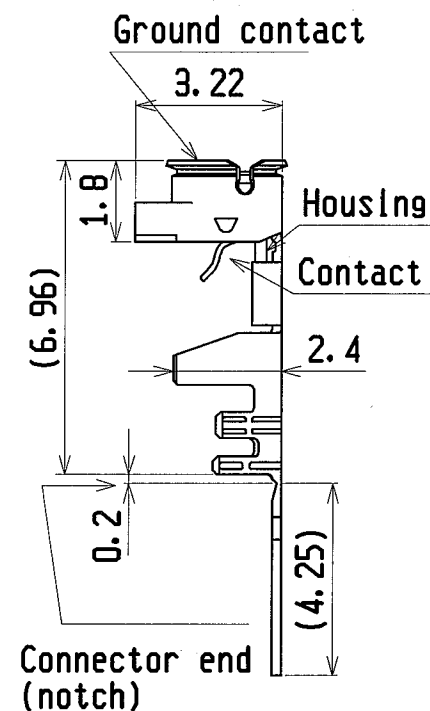
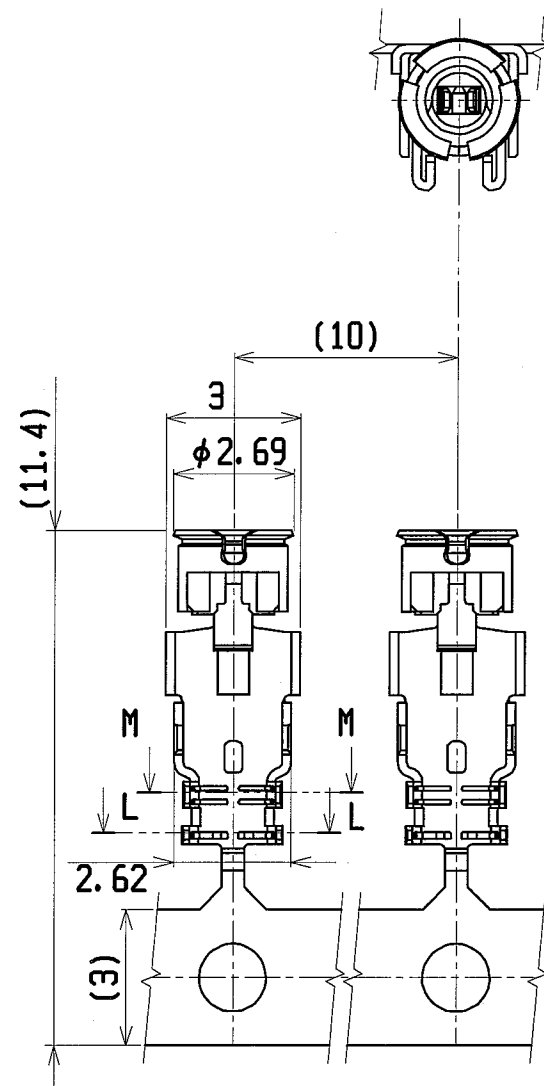
Your continued cooperation in maintaining conformance with the applicable test requirements is appreciated.

If we can be of any further assistance, please do not hesitate to contact Xiao-lan Zhou at +86 512 6875 8537, Ext. 66537, or via email at FUSAdmin.SUZ@ul.com.

**Note: Should any of your FUS Sample Testing contact information change, please let us know so our records can be updated.**

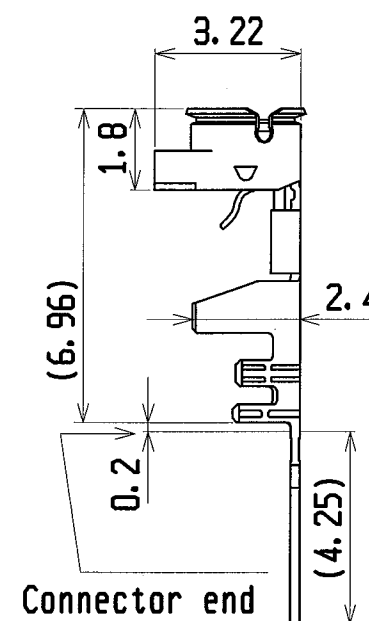
CC:

PART NO.  
20278-...R-...



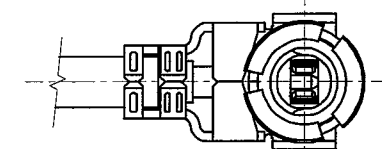
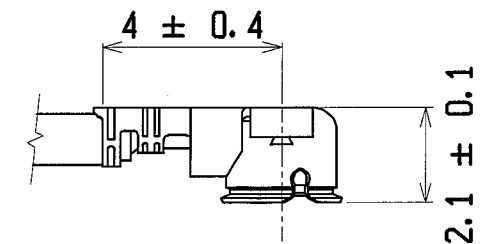
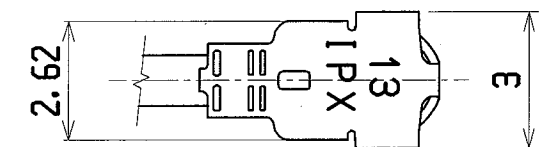
Part No. 20278-101R-08  
20278-102R-08  
20278-101R-13  
20278-102R-13  
20278-101R-32  
20278-102R-32

For hand tool  
(with notch)



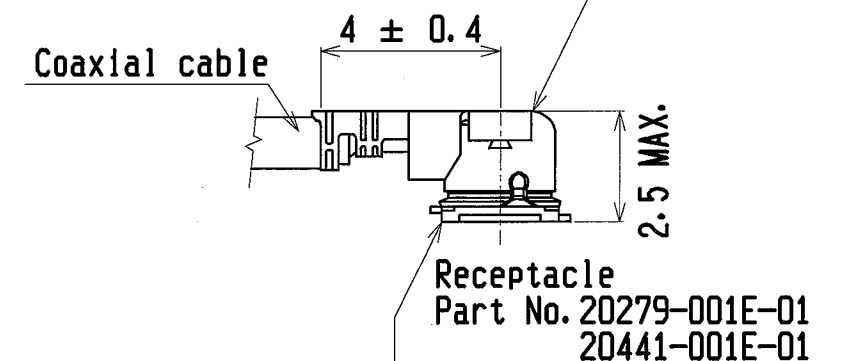
Part No. 20278-111R-08  
20278-112R-08  
20278-111R-13  
20278-112R-13  
20278-111R-32  
20278-112R-32

For semi auto  
termination machine  
(without notch)



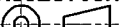
Cable Ass'y

Plug  
P/N 20278-1...R-08  
P/N 20278-1...R-13  
P/N 20278-1...R-32

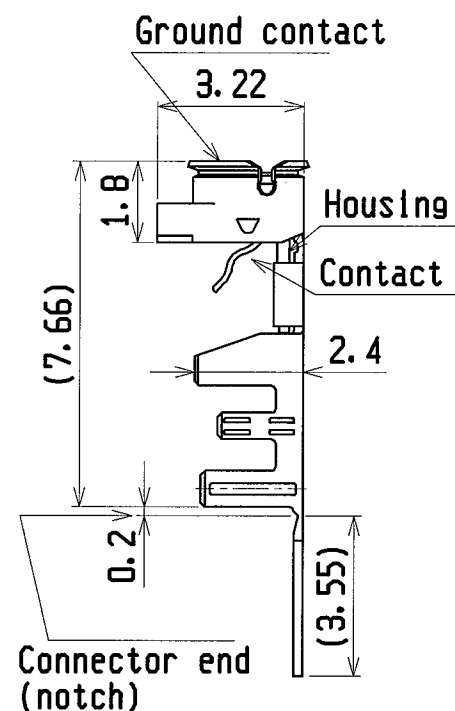
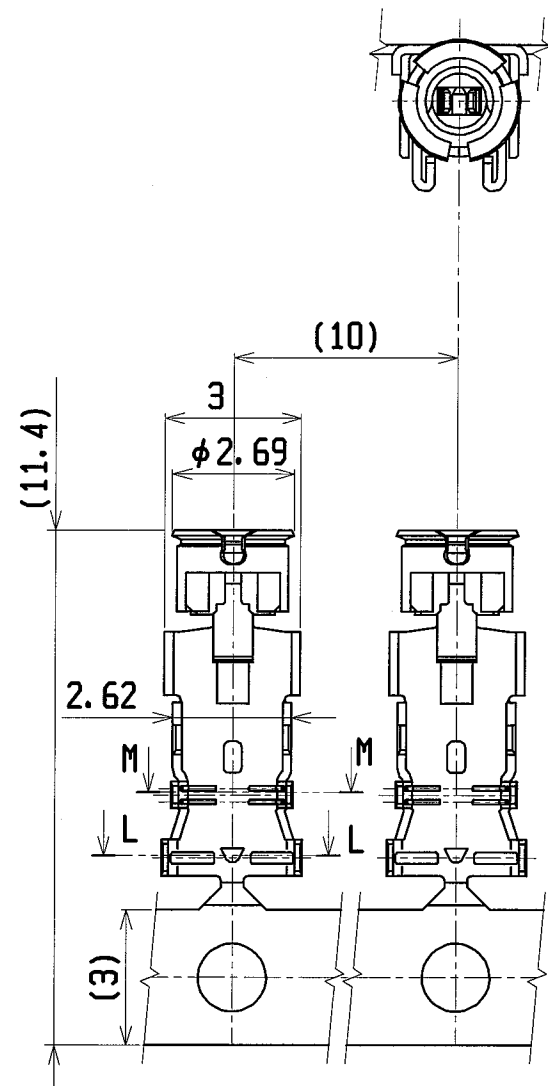


MATING

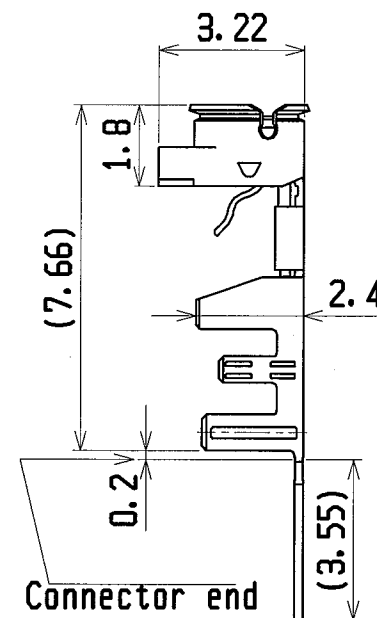
| GENERAL TOLERANCE |      |  |
|-------------------|------|--|
| 6 MAX.            | ±0.2 |  |
| 6 OVER MAX. 30    | ±0.3 |  |
| 30 OVER MAX. 120  | ±0.5 |  |
| ANGLE             | ±2°  |  |

|             |        |      |           |     |                  |                                                                                                     |                                                                                                                           |      |          |       |      |
|-------------|--------|------|-----------|-----|------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|------|----------|-------|------|
| 19C         | Z08056 | K.O  | Feb/04/08 | EK  | DESIGN'D BY      | DATE                                                                                                | <div><div>I-PEX</div><div>Interconnect<br/>and Packaging Electronics<br/>TOKYO, JAPAN</div></div>                         |      |          |       |      |
| 18C         | Z07346 | K.O  | Jul/10/08 | E.K | K. Ohbayashi     | JUN/13/01                                                                                           |                                                                                                                           |      |          |       |      |
| 17C         | Z05233 | K.O  | May/18/05 | T.H | CHK'D BY         | DATE                                                                                                | <div><div>TITLE</div><div>MF series micro coaxial connector plug<br/>vertical (ground contact : gold plating)</div></div> |      |          |       |      |
| 16C         | Z05024 | K.O  | Jan/20/05 | T.H |                  |                                                                                                     |                                                                                                                           |      |          |       |      |
| 15C         | Z04398 | K.O  | Nov/12/04 | T.H | APP'D BY         | DATE                                                                                                | <div><div>General</div></div>                                                                                             |      |          |       |      |
| REV         | ECN    | BY   | DATE      | APP | K. Katabuchi     | JUN/13/01                                                                                           |                                                                                                                           |      |          |       |      |
| REV. RECORD |        |      |           |     | CUSTOMER<br>COPY | PROJECTION<br> | SCALE                                                                                                                     | UNIT | DWG. No. | SHEET | REV. |
| SERIES No.  |        | 2814 |           |     |                  |                                                                                                     | 6/1                                                                                                                       | mm   | 20278    | 1/4   | 19C  |

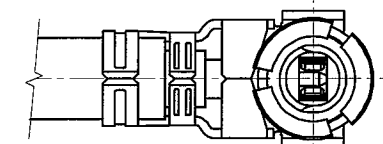
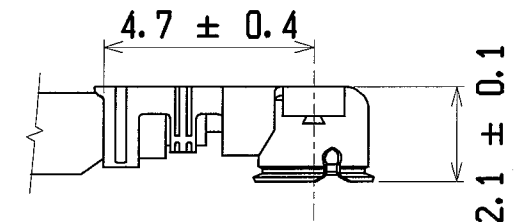
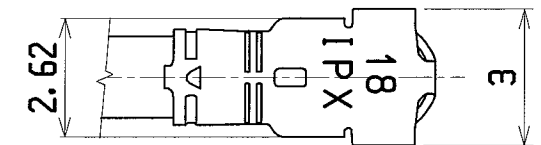
PART NO.  
20278-\*\*\*R-\*\*\*



Part No. 20278-101R-18  
20278-102R-18  
For hand tool  
(with notch)

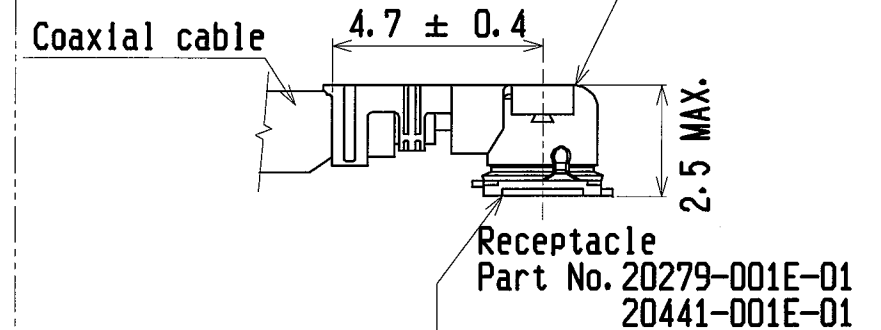


Part No. 20278-111R-18  
20278-112R-18  
For semi auto  
termination machine  
(without notch)



Cable Ass'y

Plug  
P/N 20278-1\*\*R-18



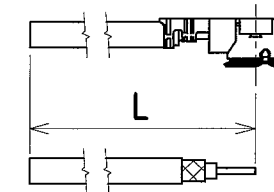
MATING

| GENERAL TOLERANCE |      |
|-------------------|------|
| 6 MAX.            | ±0.2 |
| 6 OVER MAX. 30    | ±0.3 |
| 30 OVER MAX. 120  | ±0.5 |
| ANGLE             | ±2°  |

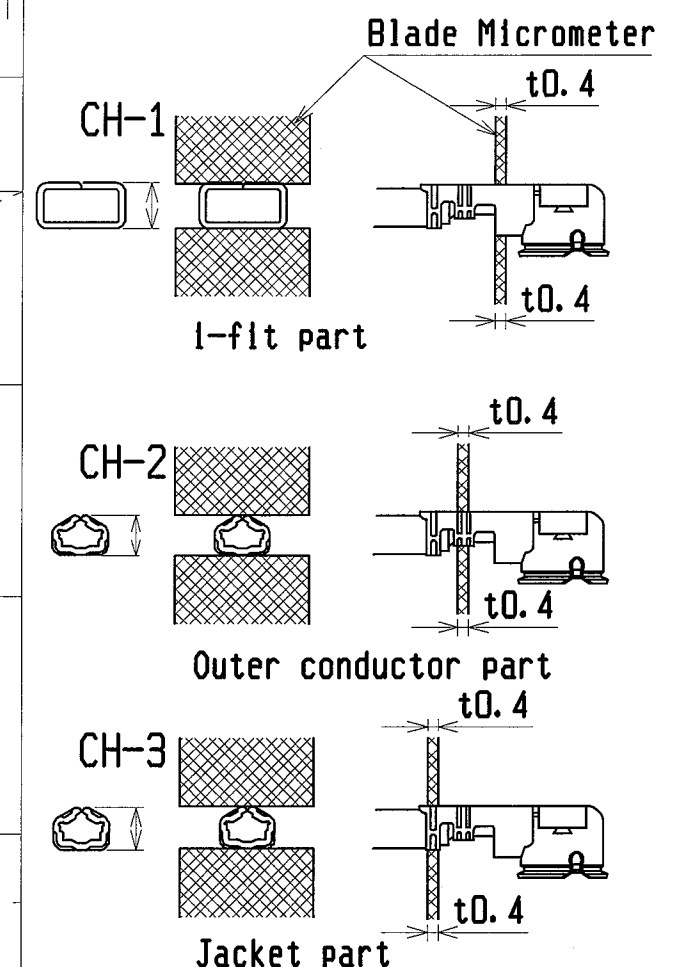
|                 |     |    |      |     |                                                                                     |  |                                                                                       |  |                                                                                         |         |          |  |       |      |
|-----------------|-----|----|------|-----|-------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------|---------|----------|--|-------|------|
| <div></div>     |     |    |      |     | DESIGN' D BY                                                                        |  | DATE                                                                                  |  | <div>I-PEX</div> <div>Interconnect<br/>and Packaging Electronics<br/>TOKYO, JAPAN</div> |         |          |  |       |      |
|                 |     |    |      |     | CHK' D BY                                                                           |  | DATE                                                                                  |  |                                                                                         |         |          |  |       |      |
|                 |     |    |      |     | APP' D BY                                                                           |  | DATE                                                                                  |  |                                                                                         |         |          |  |       |      |
| REV             | ECN | BY | DATE | APP | TITLE                                                                               |  |                                                                                       |  |                                                                                         | General |          |  |       |      |
| REV. RECORD     |     |    |      |     | MHF series micro coaxial connector plug<br>vertical (ground contact : gold plating) |  |                                                                                       |  |                                                                                         |         |          |  |       |      |
| SERIES No. 2814 |     |    |      |     | CUSTOMER COPY                                                                       |  | PROJECTION                                                                            |  | SCALE                                                                                   | UNIT    | DWG. No. |  | SHEET | REV. |
|                 |     |    |      |     |                                                                                     |  |  |  | 6/1                                                                                     | mm      | 20278    |  | 2/4   | 19C  |

|                                              |      |                                |                                |                                |                                |
|----------------------------------------------|------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Part No. of non halogen free type            |      | 20278-101R-08<br>20278-111R-08 | 20278-101R-13<br>20278-111R-13 | 20278-101R-32<br>20278-111R-32 | 20278-101R-18<br>20278-111R-18 |
| Part No. of halogen free type                |      | 20278-102R-08<br>20278-112R-08 | 20278-102R-13<br>20278-112R-13 | 20278-102R-32<br>20278-112R-32 | 20278-102R-18<br>20278-112R-18 |
| Housing color                                |      | White                          | Black                          | Black                          | White                          |
| Applicable cable nominal dimension           |      | <p>※ NOTE-1</p>                | <p>※ NOTE-1</p>                | <p>※ NOTE-1</p>                | <p>※ NOTE-1</p>                |
| Braided shield of Outer conductor<br>外部導体の編組 |      | Single / 1重編組                  | Single / 1重編組                  | Double / 2重編組                  | Single / 1重編組                  |
| P/N of hand Tool                             |      | 90187-008C                     | 90187-013C                     | 90187-032C                     | 90233-018                      |
| P/N of semi auto termination machine         |      | 90213-008C                     | 90213-013C                     | 90213-032C                     | 90232-018                      |
| Sect. M-M                                    |      |                                |                                |                                |                                |
| Sect. L-L                                    |      |                                |                                |                                |                                |
| Crimp Height                                 | CH-1 | 1.34~1.40                      | 1.34~1.40                      | 1.34~1.40                      | 1.34~1.40                      |
|                                              | CH-2 | 0.76~0.84                      | 1.06~1.14                      | 1.20~1.30                      | 1.41~1.49                      |
|                                              | CH-3 | 0.85~0.97                      | 1.15~1.35                      | 1.26~1.46                      | 1.70~1.80                      |

Cable cut length



Crimp Height



NOTE-1

中心導体, 外部導体への半田コーティングは不可  
Must not use solder coated  
inner conductor and outer conductor.

|                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |  |  |                                                                                                                                                                          |  |            |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------|----------|
| <div style="display: flex; justify-content: space-between;"> <div>             DESIGN'D BY<br/>             CHK'D BY<br/>             APP'D BY<br/>             REV ECN BY DATE APP<br/>             REV. RECORD<br/>             SERIES No. 2814           </div> <div>             DATE<br/>             DATE<br/>             DATE<br/>             CUSTOMER COPY<br/>             PROJECTION           </div> </div> |  |  |  |  | <b>I-PEX</b> Interconnect and Packaging Electronics TOKYO, JAPAN<br>TITLE<br>MHF series micro coaxial connector plug vertical (ground contact : gold plating)<br>General |  |            |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |  |  |                                                                                                                                                                          |  | SCALE UNIT | DWG. No. |
|                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |  |  |                                                                                                                                                                          |  | 20278      | 3/4 19C  |
|                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |  |  |                                                                                                                                                                          |  | mm         |          |

# Notes

## 1. Material

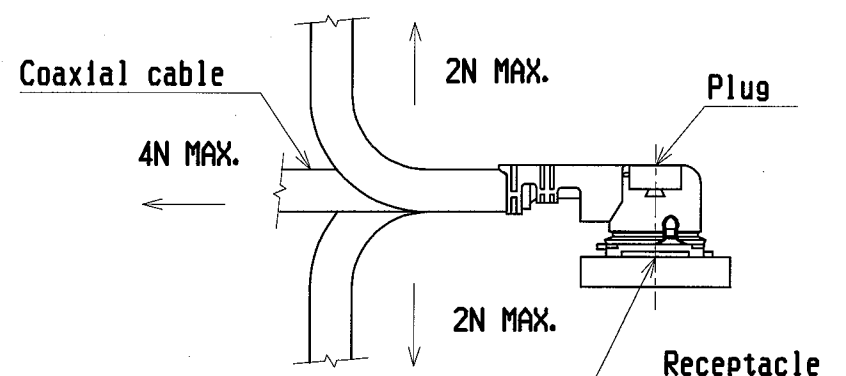
- (1) Housing : PBT , UL94V-0
- (2) Contact  
phosphor bronze  
gold plating 0.1 $\mu$ m MIN.  
over nickel 1.27 $\mu$ m MIN.
- (3) Ground contact  
phosphor bronze  
gold plating 0.05 $\mu$ m MIN.  
over nickel 1.27 $\mu$ m MIN.

## 2. Packing : reel

## 3. Mating partner part No.

: 20279-001E-01, 20441-001E-01

## 4. Permissible load of cable at mating



## 5. Suggestions for mating & unmating operation.

### 5-1 Mating.

Please mate the connector straightly to vertical direction as much as possible, adjusting the mating axis of plug and receptacle. As excessive slant angle mating may break the connector, please don't do it.

## 1. 材料

- (1) ハウジング : PBT, UL94V-0
- (2) コンタクト  
りん青銅  
金メッキ0.1 $\mu$ m MIN.  
下地 ニッケル1.27 $\mu$ m MIN.
- (3) グランドコンタクト  
りん青銅  
金メッキ0.05 $\mu$ m MIN.  
下地 ニッケル1.27 $\mu$ m MIN.

## 2. 梱包 : リール

## 3. かん合相手 part No.

: 20279-001E-01, 20441-001E-01

## 4. コネクタかん合後のケーブルに対する荷重

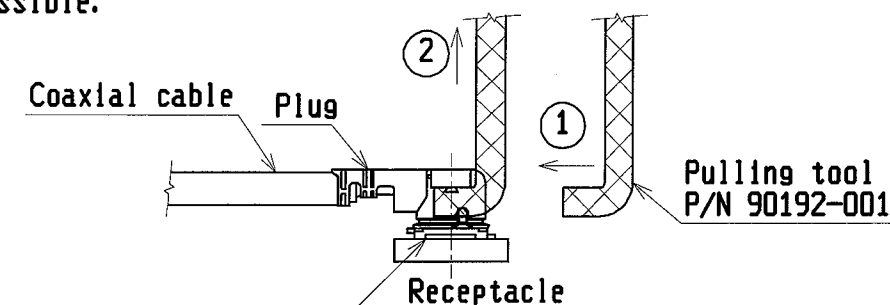
## 5. コネクタかん合時および抜去時の注意

### 5-1 コネクタ挿入時

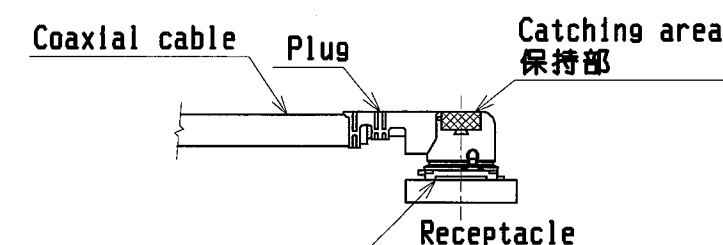
PlugとReceptacleのかん合軸を合わせ、できるだけ垂直に挿入して下さい。極端な斜め挿入は行わないで下さい。コネクタ破損の原因となりますので、過度なこじり挿抜は行わないで下さい。

## 5-2 Unmating.

- (1) In case of unmating by pulling tool.  
Please use the pulling tool as the following drawing, and please pull plug to vertical direction as directly as possible.



- (2) In case of unmating directly by hand  
Please catch the catching area of plug, and please pull plug to vertical direction as directly as possible.



## 5-3 Crimp over standards of outer conductor

Standards: Less than 10% from total numbers of outer conductor  
(Numbers of outer conductor's crimp over from outer conductor's barrel)

## 5-4 Caution about Heat shrinkage tubes

Please be careful not to melt housing when using heat shrinkage tubes. It will become cause of open circuit.

## 6. This is 'Pb-free' connector.

## 5-2 コネクタ抜去時

- (1) 抜去ジグを用いる場合  
下図のようにできるだけ垂直に引き抜いて下さい。

- (2) 手で直接引き抜く場合  
下図の保持部をつかみ、できるだけ垂直に引き抜いて下さい。

## 5-3 外部導体はみ出し量

外部導体はみ出し量規定  
: 外部導体トータル本数の10%以下  
(外部導体パレルの外にはみ出し量)

## 5-4 熱収縮チューブについての注意

熱収縮チューブで外部導体を覆う場合は、導通不良の原因になりますので、熱によりハウジングを溶融させないよう注意してください。

## 6. 本コネクタは'Pb-free'である

| GENERAL TOLERANCE |               |
|-------------------|---------------|
| 6 MAX.            | $\pm 0.2$     |
| 6 OVER MAX. 30    | $\pm 0.3$     |
| 30 OVER MAX. 120  | $\pm 0.5$     |
| ANGLE             | $\pm 2^\circ$ |

|                 |     |    |      |     |                                                                                     |  |                                                                                       |  |                                                                                        |      |          |  |       |      |
|-----------------|-----|----|------|-----|-------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------|------|----------|--|-------|------|
| <div></div>     |     |    |      |     | DESIGN' D BY                                                                        |  | DATE                                                                                  |  | <div>I-PEX<div>Interconnect<br/>and Packaging Electronics<br/>TOKYO, JAPAN</div></div> |      |          |  |       |      |
|                 |     |    |      |     | CHK' D BY                                                                           |  | DATE                                                                                  |  |                                                                                        |      |          |  |       |      |
|                 |     |    |      |     | APP' D BY                                                                           |  | DATE                                                                                  |  |                                                                                        |      |          |  |       |      |
| REV             | ECN | BY | DATE | APP | TITLE                                                                               |  |                                                                                       |  |                                                                                        |      | General  |  |       |      |
| REV. RECORD     |     |    |      |     | MHF series micro coaxial connector plug<br>vertical (ground contact : gold plating) |  |                                                                                       |  |                                                                                        |      |          |  |       |      |
| SERIES No. 2814 |     |    |      |     | CUSTOMER COPY                                                                       |  | PROJECTION                                                                            |  | SCALE                                                                                  | UNIT | DWG. No. |  | SHEET | REV. |
|                 |     |    |      |     |                                                                                     |  |  |  | -/-                                                                                    | mm   | 20278    |  | 4/4   | 19C  |

No.06027-1  
Feb / 26/'08

材料証明書  
MATERIAL CERTIFICATE

当社製品には下記の材料が使われている事を証明致します。  
WE HEREBY CERTIFY THAT THE FOLLOWING MATERIALS ARE USED IN OUR PRODUCT.

PRODUCT NAME : MHF series micro coaxial connector PLUG & RECEPTACLE VERTICAL

Plug, Non halogen free type

| Part No.      | Contents      | Housing              | Contact                         | Ground contact                 |
|---------------|---------------|----------------------|---------------------------------|--------------------------------|
| 20278-101R-08 | 材質名/ Material | PBT                  | Phosphor bronze                 | Phosphor bronze                |
| 20278-111R-08 |               |                      |                                 |                                |
| 20278-101R-13 | 型名/ Cat No.   | DURANEX 3116         | C5210R-H                        | C5191R-1/2H                    |
| 20278-111R-13 |               |                      |                                 |                                |
| 20278-101R-32 | 材料メーカー        | WINTECH POLYMER LTD. | Nippon Mining & Metals Co.,Ltd. | HARADA METAL INDUSTRY Co.,Ltd. |
| 20278-111R-32 | Manufacturer  |                      |                                 |                                |
| 20278-101R-18 |               |                      |                                 |                                |
| 20278-111R-18 | UL94難燃性       | V-0                  | -----                           | -----                          |
| 20308-101R-13 | UL94 flame    |                      |                                 |                                |
| 20308-111R-13 | class         |                      |                                 |                                |
| 20308-101R-32 |               |                      |                                 |                                |
| 20308-111R-32 | UL file No.   | E213445              | -----                           | -----                          |
| 20351-101R-37 |               |                      |                                 |                                |
| 20351-111R-37 |               |                      |                                 |                                |

※添付資料 : ULカード写し／UL CARD COPY

| APPROVAL               | CHECK                  | ORIGINATOR                |
|------------------------|------------------------|---------------------------|
| T.Harada<br>Feb/26/'08 | T.Tagawa<br>Feb/26/'08 | K.Ohbayashi<br>Feb/26/'08 |

## Plug, Halogen free type

| Part No.      | Contents      | Housing              | Contact                         | Ground contact                 |
|---------------|---------------|----------------------|---------------------------------|--------------------------------|
| 20278-102R-08 | 材質名/ Material | PBT                  | Phosphor bronze                 | Phosphor bronze                |
| 20278-112R-08 | 型名/ Cat No.   | XFR4840 GF10         | C5210R-H                        | C5191R-1/2H                    |
| 20278-102R-13 | 材料メーカー        | WINTECH POLYMER LTD. | Nippon Mining & Metals Co.,Ltd. | HARADA METAL INDUSTRY Co.,Ltd. |
| 20278-112R-13 | Manufacturer  |                      |                                 |                                |
| 20278-102R-32 | UL94難燃性       | V-0                  | -----                           | -----                          |
| 20278-112R-32 | UL94 flame    |                      |                                 |                                |
| 20278-102R-18 | class         |                      |                                 |                                |
| 20278-112R-18 | UL file No.   | E213445              | -----                           | -----                          |
| 20351-102R-37 |               |                      |                                 |                                |
| 20351-112R-37 |               |                      |                                 |                                |

※添付資料：ULカード写し／UL CARD COPY

## Receptacle

| Part No.      | Contents      | Housing              | Contact                         | Ground contact                 |
|---------------|---------------|----------------------|---------------------------------|--------------------------------|
| 20279-001E-01 | 材質名/ Material | LCP                  | Brass                           | Phosphor bronze                |
| 20314-001E-01 | 型名/ Cat No.   | VECTRA E130i         | C2680R-o                        | C5191R-1/2H                    |
|               | 材料メーカー        | Polyplastics Co.,Ltd | Nippon Mining & Metals Co.,Ltd. | HARADA METAL INDUSTRY Co.,Ltd. |
|               | Manufacturer  |                      |                                 |                                |
|               | UL94難燃性       | V-0                  | -----                           | -----                          |
|               | UL94 flame    |                      |                                 |                                |
|               | class         |                      |                                 |                                |
|               | UL file No.   | E 106764             | -----                           | -----                          |

※添付資料：ULカード写し／UL CARD COPY

QMFZ2 Component – Plastics Friday, October 24, 2003 E213445

WINTECH POLYMER LTD  
18-1 KONAN 2-CHOME MINATO-KU TOKYO 108-8280 JP

Material Designation: **3116(e)**  
Product Description: Polybutylene Terephthalate (PBT), designated "Duranex" furnished as pellets.

| Color                                      | Min. Thick. (mm) | Flame Class                                     | HWI | HAI | RTI Elec | RTI Imp | RTI Str                                  | IEC GWIT                   | IEC GWFI |
|--------------------------------------------|------------------|-------------------------------------------------|-----|-----|----------|---------|------------------------------------------|----------------------------|----------|
| ALL                                        | 0.75             | V-0                                             | 4   | 0   | 130      | —       | 130                                      | —                          | —        |
|                                            | 1.5              | V-0                                             | 3   | 0   | 130      | 120     | 130                                      | —                          | —        |
| NC, BK                                     | 3                | 5VA                                             | 2   | 0   | 130      | 120     | 130                                      | —                          | —        |
| CTI: 2                                     | IEC CTI (V): —   | HVTR: 3                                         |     |     | D495: 6  |         |                                          | IEC Ball Pressure (° C): — |          |
| Dielectric Strength (kV/mm): 23            |                  | Volume Resistivity (10 <sup>9</sup> ohm-cm): 16 |     |     |          |         | Dimensional Stability(%):0.0             |                            |          |
| ISO Tensile Strength (MPa): —              |                  | ISO Flexural Strength (MPa): —                  |     |     |          |         | ISO Heat Deflection (C): —               |                            |          |
| ISO Tensile Impact (kJ/m <sup>2</sup> ): — |                  | ISO Izod Impact (kJ/m <sup>2</sup> ): —         |     |     |          |         | ISO Charpy Impact(kJ/m <sup>2</sup> ): — |                            |          |

(e) Virgin and regrind from 1 to 50 by weight incl. have the same basic material characteristics (at a minimum thickness of 0.75 mm), except for 310EP which has a lower as received Tensile Impact value from 26 to 50 percent regrind.

Report Date: 11/15/2000 Underwriters Laboratories IncR

UL94 small-scale test data does not pertain to building materials, furnishings and related contents. UL 94 small-scale test data is intended solely for determining the flammability of plastic materials used in components and parts of end-product devices and appliances, where the acceptability of the combination is determined by ULI.

Component - Plastics

E213445

**WINTech POLYMER LTD**

18-1 KONAN 2-CHOME, MINATO-KU, TOKYO 108-8280 JP

**XFR 4840 GF10**

Polybutylene Terephthalate (PBT), "Duranex", furnished as pellets

| Color | Min Thk<br>(mm) | Flame<br>Class | HWI | HAJ | RTI<br>Elec | RTI<br>Imp | RTI<br>Str |
|-------|-----------------|----------------|-----|-----|-------------|------------|------------|
| ALL   | 0.75            | V-0            | 1   | 0   | 75          | 75         | 75         |
|       | 1.5             | V-0            | 1   | 0   | 75          | 75         | 75         |
|       | 3.0             | V-0            | 1   | 0   | 75          | 75         | 75         |

Comparative Tracking Index (CTI): **1**

Dimensional Stability (%): -

High-Voltage Arc Tracking Rate  
(HVT): **0**High Volt, Low Current Arc Resis (D495): **5**Dielectric Strength (kV/mm): **24**Volume Resistivity (10xohm-cm): **14**

UL94 small-scale test data does not pertain to building materials, furnishings and related contents. UL94 small-scale test data is intended solely for determining the flammability of plastic materials used in the components and parts of end-product devices and appliances, where the acceptability of the combination is determined by ULL.

Report Date: 2006-07-24

Last Revised: 2006-07-25

Underwriters Laboratories Inc®

**IEC and ISO Test Methods**

| Test Name                      | Test Method     | Units         | Thickness<br>Tested (mm) | Value     |
|--------------------------------|-----------------|---------------|--------------------------|-----------|
| IEC Flammability               | IEC 60695-11-10 | Class (color) | 0.75                     | V-0 (ALL) |
|                                |                 |               | 1.5                      | V-0 (ALL) |
|                                |                 |               | 3.0                      | V-0 (ALL) |
| Glow-Wire Flammability (GWFI)  | IEC 60695-2-12  | C             | -                        | -         |
| Glow-Wire Ignition (GWIT)      | IEC 60695-2-13  | C             | -                        | -         |
| IEC Comparative Tracking Index | IEC 60112       | Volts (Max)   | -                        | -         |
| IEC Ball Pressure              | IEC 60695-10-2  | C             | -                        | -         |
| ISO Heat Deflection (1.80 MPa) | ISO 75-2        | C             | -                        | -         |
| ISO Tensile Strength           | ISO 527-2       | MPa           | -                        | -         |
| ISO Flexural Strength          | ISO 178         | MPa           | -                        | -         |
| ISO Tensile Impact             | ISO 8256        | kJ/m2         | -                        | -         |
| ISO Izod Impact                | ISO 180         | kJ/m2         | -                        | -         |
| ISO Charpy Impact              | ISO 179-2       | kJ/m2         | -                        | -         |

Underwriters Laboratories Inc®

**POLYPLASTICS CO LTD**  
VECTRA DIV 18-1 KONAN 2-CHOME MINATO-KU TOKYO 108-8280 JAPAN

Material Designation: **E130i(d)(e)**

Product Description: Liquid Crystal Polymer (LCP), thermotropic aromatic polyester, designated "Vectra" furnished as pellets.

| Color                                      | Min. Thick. (mm) | Flame Class                                     | HWI | HAI     | RTI Elec | RTI Imp | RTI Str                                   | IEC GWIT | IEC GWFI |
|--------------------------------------------|------------------|-------------------------------------------------|-----|---------|----------|---------|-------------------------------------------|----------|----------|
| ALL                                        | 0.75             | V-0                                             | 2   | 4       | 240      | 220     | 240                                       | -        | -        |
|                                            | 1.5              | V-0                                             | 1   | 4       | 240      | 220     | 240                                       | -        | -        |
|                                            | 3.0              | V-0                                             | 0   | 4       | 240      | 220     | 240                                       | -        | -        |
| CTI: 4                                     |                  | HVTR: 0                                         |     | D495: 5 |          |         | IEC Ball Pressure (°C): -                 |          |          |
| Dielectric Strength (kV/mm): 39            |                  | Volume Resistivity (10 <sup>9</sup> ohm-cm): 16 |     |         |          |         | Dimensional Stability(%): 0               |          |          |
| ISO Tensile Strength (MPa): -              |                  | ISO Flexural Strength (MPa): -                  |     |         |          |         | ISO Heat Deflection (°C): -               |          |          |
| ISO Tensile Impact (kJ/m <sup>2</sup> ): - |                  | ISO Izod Impact (kJ/m <sup>2</sup> ): -         |     |         |          |         | ISO Charpy Impact (kJ/m <sup>2</sup> ): - |          |          |

- (d)Virgin and regrind up to 50% by weight incl. have the same basic material characteristics for colors NC and BK.
- (e)In addition, regrind at 26 to 50% have the same basic characteristics at a minimum of 1.5mm except RTI's for the Mechanical w/Impact property is 180C.

UL94 small-scale test data does not pertain to building materials, furnishings and related contents. UL 94 small-scale test data is intended solely for determining the flammability of plastic materials used in components and parts of end-product devices and appliances, where the acceptability of the combination is determined by ULI.

# SAFETY DATA SHEET(SDS)

Issued: October 3, 2012  
Revised: February 10, 2014

FileNo. 2302-1

## 1. Chemical Product & Company Identification

CHEMICALPRODUCT NAME: DURANEX® 310NF EF2001  
NAME OF COMPANY: WinTech Polymer Ltd.  
ADDRESS: 2-18-1 Konan, Minato-ku, Tokyo, 108-8280 Japan  
SECTION IN CHARGE: Quality Assurance Dept.  
TELEPHONE NUMBER: 03-6711-8605  
FACSIMILE NUMBER: 03-6711-8616

## 2. Hazards identification

### [ GHS CLASSIFICATION ]

Physical and Chemical Hazards :  
· Flammable solids : Classification not possible  
· Self-reactive substances and mixtures : Not applicable  
· Pyrophoric solids : Not classified  
· Self-heating substances and mixtures : Not classified  
· Substances and mixtures, which in contact with water, emit flammable gases : Not classified  
· Oxidizing solids : Not classified  
· Corrosive to metal : Not classified

Health Hazards :  
· Carcinogeneses : No hazard  
· Specific target organ/systemic toxicity (Repeated exposure) : No hazard

### [ GHS CLASSIFICATION ]

Environmental Hazards : No hazard

### [ SYMBOL ]

: None

### [ SIGNAL WORD ]

: None

### [ HAZARD STATEMENT ]

: None

### [ PRECAUTIONARY STATEMENTS ]

Prevention :  
· Wash hands thoroughly after handling.  
· Wear protective gloves.

Response : -

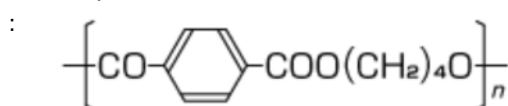
Storage : Avoid direct sunlight and store in a well-ventilated place.

Disposal : Dispose of contents/container in accordance with local & national regulations.

## 3. Composition/information on ingredients

SUBSTANCE/PREPARATION : Preparation  
COMMON CHEMICAL NAME : Polybutyleneterephthalate  
SYNONYMS : Polybutyleneterephthalate(PBT)  
INGREDIENTS AND COMPOSITION : PBT  $\geq 67\%$ , Glass fiber 10%,  
Phosphorus flame retardant and others  $\leq 23\%$

### CHEMICAL FORMULA



SERIAL No. IN OFFICIAL GAZETTE : 7-1039(base resin) (Law Concerning Examination and Regulation of Manufacture, etc., of Chemical Substances)

CAS No. : 24968-12-5(base resin)

INGREDIENTS CONTRIBUTING TO THE HAZARD : Cadmium, lead, hexavalent chromium and mercury are not used in this grade.

## 4. First-aid measures

INGESTION : When a gas generated from the molten polymer has been inhaled, move to area of fresh air without delay and wait until the victim is

|                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SKIN CONTACT                                  | recovered. If sick feeling continues, ask a physician for advice.<br>: Cool the contacted skin with clean water without delay, if a contact with the polymer in a molten form. Do not force to remove the solid resin on the skin. If any burns are observed on the skin, ask a physician for advice.                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| EYE CONTACT                                   | : Cool and rinse the eye with clean water for at least 15 minutes when the eyes had contact with molten polymer. In case of wearing contact lenses, remove the lenses as soon as possible, and ask a physician for advice. When the eye had contact with the polymer in an ordinary solid form, rinse the eye with clean water without delay. If the discomfort persists, ask a physician for advice.                                                                                                                                                                                                                                                                                                                                           |
| SWALLOW                                       | : Help to vomit as much as possible. If sick feeling continues, and ask a physician for advice.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <hr/>                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 5. Fire-fighting measures                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| EXTINGUISHING MEDIA                           | : Water, foam fire-extinguishing agent, powder fire-extinguishing agent, and carbon dioxide gas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| SPECIFIC METHODS                              | : Extinguish the fire with water. A method of extinguishing an ordinary fire may be applied. Do not apply water directly to processing machines.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| SPECIFIC HAZARDS                              | : Incomplete combustion leads to generation of toxic gases such as carbon monoxide or tetrahydrofuran, in addition to carbonic acid gas and water.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS | : In case the fire gained force, use a gas mask or other protective equipment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <hr/>                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 6. Accidental release measures                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| PERSONAL PRECAUTIONS                          | : When pellets were spilled on the road or floor, wipe them off with a besom or cleaner not to cause slipping.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| ENVIRONMENTAL PRECAUTION                      | : Handle the spillage in accordance with provisions given in the "Resin pellet spillage preventive manual", in order to prevent intakes by marine animals and birds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <hr/>                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 7. Handling and storage                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| HANDLING                                      | : This resin in a pellet form will neither ignite nor explode at room temperatures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| HANDLING 2                                    | : This pellets spilled on the floor are likely to cause slipping. Remove such spillage at any times.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| HANDLING 3                                    | : For molding work, effective means for local exhaust are required to discharge gases generated by melt processing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| HANDLING 4                                    | : Avoid inhaling of gases generated in molding work. Do not directly touch resin of high temperature.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| HANDLING 5                                    | : Avoid retaining hot resin in the processing machines for many hours.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| HANDLING 6                                    | : Glass fibers are not generally exposed in a single substance under normal processing and handling conditions as they are compounded in pellets. However, the following measures will be necessary to minimize the exposure to glass fibers or dusts containing glass fibers, when pellets or molded parts containing glass fibers are cut, ground or burnt, depending on environmental and operational conditions.<br>·Those who are sensitive in skin to glass fiber should wear suitable(protective) clothes to minimize the exposure of their skin.<br>·Wash working clothes apart from other laundry, so that the latter will not cause contamination with glass fibers.<br>·Provide the workshop with partitions to prevent diffusion of |

glass fiber dusts.

·Pay precautions not to rub face, neck or arms with hands. Wash hands and gargle after working without fall.

·Keep dust sources totally enclosed.

·Provide local air exhausters and implement periodical inspections and adjustments at least once a year.

·Reduce cutting and grinding processes to the possible minimum, and devise working procedures to minimize dust generation.

·Provide dust-preventive masks, protective glasses and gloves for personal hygiene.

·Determine the operational environment at indoor working places and confirm the effects of environmental improvement.

Note) Glass fibers are, like road dusts, told to be least hazardous to human bodies, but proper measures are required to avoid useless inhaling.

STORAGE : Keep the substance away from any fire or heat sources for the sake of safe storage.

STORAGE 2 : Handle in accordance with municipal rules and regulations.

RECOMMENDED PACKAGING : No information.

#### MATERIALS

---

#### 8. Exposure controls/ personal protection

CONTROL CONCENTRATION : None at present

PERMISSIBLE CONCENTRATION : OSHA PEL/1985

Max. permissible concentration of inactive powder 15mg/m<sup>3</sup>

– ditto – (Aspiration ) 5 mg/m<sup>3</sup>

ACGIH TLV/1992 1993

Exposure limit of the powder TWA 10 mg/m<sup>3</sup>

ENGINEERING MEASURE : ·When handling dust: Use totally enclosed containers resisting dust explosion.

·When heat melted in molding: Effective local ventilation must be provided.

#### PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION : Wear a dust-proof mask.

HAND PROTECTION : Wear heat-resisting gloves against burns, when handling molten polymer.

EYE PROTECTION : Wear protective glasses or goggles.

SKIN & BODY PROTECTION : Wear long sleeve clothes against burns, when handling molten polymer.

---

#### 9. Physical and chemical properties

APPEARANCE etc. : Pellet

BOILING POINT : Not applicable

VAPOUR PRESSURE : Not applicable

VOLATILITY : Not applicable

INITIAL BOILING POINT : Not applicable

SUBLIMATION : None

MELTING POINT : 228°C

DENSITY : 1.40

SOLUBILITY : Insoluble in water

FLASH POINT : 300°C or higher

IGNITION POINT : 300°C or higher

EXPLOSION PROPERTY : Not applicable

INFLAMMABILITY : None

REACTIVITY WITH WATER : None

OXIDIZABILITY : None

SELF-REACTIVITY : None

DUST EXPLOSIVENESS : Upper explosion limit : Not applicable. Lower explosion limit : 35g/m<sup>3</sup>

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10. Stability and reactivity

STABILITY AND REACTIVITY : Stable for normal storage or handling.

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11. Toxicological information

SKIN CORROSION/IRRITATION : No finding.  
SERIOUS EYE DAMAGE/IRRITATION : Gas generated in drying or melting is irritating eyes and skins.  
RESPIRATORY OR SKIN : No finding  
SENSITISATION  
ACUTE TOXICITY(INCLUDING LD50) : No finding.  
SUBACUTE TOXICITY : No finding.  
CHRONIC TOXICITY : No finding.  
CARCINOGENECITY : No finding.  
MUTAGENECITY(Micro organisms, chromosomal aberration) : No finding.  
REPRODUCTIVE TOXICITY : No finding.  
TERATOGENICITY : No finding.  
OTHERS(Including generation of hazardous gases by reaction with water, for example) : No finding in this report means that there will be no hazard in general, but no proving data available at the time of reporting.  
OTHER CAUTIONS : With regard to dust, the maximum permissible concentration and limits are fixed by OSHA and ACGIH.  
OTHER CAUTIONS 2 : Information on hazards of glass fibers as filler.

〈Effects on Human Bodies〉

(1) Effects on skin

Stimulation to the skin with glass fibers may be caused when glass fibers diameter is larger than  $4.5 \sim 5 \mu\text{m}$ . They give mechanical stimulation followed by itchiness to the skin, but further continuous exposure reportedly results in extinction of stimulation. It may sometimes leads to irritable dermatitis complicated with urticaria or eczema-like reaction. It is, however reported that such dermatitis is not so serious in general and does not last too long. Therefore, skin stimulation can be prevented by proper use of glass fibers.

(2) Effects on Tumor

Investigations made on glass fibers till today reveal that there is neither increase in mortality of glass fiber production workers due to lung cancer or mesothelioma nor such cases reported.

〈Animal Test Report〉

It is suggested that carcinogenicity of mineral fibers is dependent on their shapes rather than on their constituents. According to a report on experiments using 17 kinds of artificial mineral fibers in various sizes prepared by Dr.Stanton of National Cancer Institute, in USA, statistical studies on correlations between the diameter and length of fibers and the coincidence of mesothelioma have revealed that mineral fibers having a diameter smaller than  $0.25 \mu\text{m}$  and a length larger than  $8 \mu\text{m}$  are closely related to the coincidence of cancers. Since these experiments were performed by artificially dosing the subject animals with a large quantity of glass fibers and consequently they are quite different from the actual exposures to human bodies, it is told to be problematic to make a conclusion that mineral fibers are hazardous to human health, basing on the results obtained from

these experiments. Up to the present time, there is no result obtainable to demonstrate a mechanism of glass fibers causing lung cancers in spite of experiment by long exposure to glass fibers with high concentration.

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12. Ecological information            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| BIODEGRADABILITY                      | : No finding.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| BIOACCUMULATION                       | : No finding.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| FISH TOXICITY                         | : No finding.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| HAZARDS TO OZONE LAYER                | : None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 13. Disposal considerations           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| WASTE FROM RESIDUES                   | : This is designated as waste plastics among industrial wastes by the Wastes Disposal Law. Disposal waste pellets through licensed wastes handlers or local autonomous bodies if they are handling wastes disposal.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| WASTE FROM RESIDUES 2                 | : When disposed by incineration, use the well controlled incinerators in accordance with the Wastes Disposal Law, Air Pollution Control Law and Water Pollution Prevention Law.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 14. Transport information             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| UN CLASSIFICATION NUMBER              | : Not applicable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| OTHER CAUTIONS                        | : Handle with care so as not to give damages to containers or not to be subjected to wetting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| OTHER CAUTIONS 2                      | : Secure the containers firmly so as not to cause collapsing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 15. Regulatory information            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| WASTE DISPOSAL LAW                    | : Waste plastics among industrial wastes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 16. Other information                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| HANDLING OF THE DETAILS GIVEN ABOVE   | : This SDS is the English version translated from the Japanese SDS which is prepared for domestic use.<br>Details given above are based on references, information and data available at this moment, but no warranty can be made on exactness of these details. They are also prepared on the assumption that the product will be handled in a normal way. For special handling, adequate safety and environmental measures should be taken in respect to its applications. Our products are not specifically intended for implants for medical and dental applications, and therefore they are not recommended for such applications.<br>"No finding" in this report means that there will be no hazard in general, but no proving data is available at the time of reporting. |
| WHERE TO CALL FOR FURTHER INFORMATION | : WinTech Polymer Ltd. Quality Assurance Dept.<br>Tel. No 03-6711-8605                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

\*DURANEX® is a registered trademark of Polyplastics Co., Ltd. in Japan and other countries and is used by WinTech Polymer Ltd. under license.

## MATERIAL SAFETY DATA SHEET

MSDS FILE No. (KURAMI WORKS) : 11-3917  
the date of revision : July 1th, 2010  
the date of issue : August 9th, 2011

MSDS C5210 1/5

## 1. IDENTIFICATION OF THE SUBSTANCE OR MIXTURE AND OF THE SUPPLIER

Name of chemical substance, etc. : C5210R  
(Product Name)

## Supplier's details

Manufacturer's Name : JX NIPPON MINING & METALS CORP. KURAMI WORKS  
Address : 3 Kurami, Samukawa, Koza, Kanagawa 253-0101 Japan  
Phone Number : +81-467-75-7285  
Facsimile Number : +81-467-74-2489  
Person in Charge : Hirotaka Yamasaki  
Senior Technical Supervisor,  
Quality Assurance Section

## 2. HAZARDS IDENTIFICATION

## GHS CLASSIFICATION

## PHYSICAL HAZARDS

|                                                                            |                             |
|----------------------------------------------------------------------------|-----------------------------|
| Explosives                                                                 | Not classified              |
| Flammable Gases                                                            | Not classified              |
| Flammable Aerosols                                                         | Not classified              |
| Oxidizing Gases                                                            | Not classified              |
| Gases Under Pressure                                                       | Not classified              |
| Flammable Liquids                                                          | Not classified              |
| Flammable Solids                                                           | Classification not possible |
| Self-reactive Substances and Mixtures                                      | Not classified              |
| Pyrophoric Liquids                                                         | Not classified              |
| Pyrophoric Solids                                                          | Classification not possible |
| Self-heating Substances and Mixtures                                       | Classification not possible |
| Substances and Mixtures which, in contact with Water, emit Flammable Gases | Classification not possible |
| Oxidizing Liquids                                                          | Not classified              |
| Oxidizing Solids                                                           | Not classified              |
| Organic Peroxides                                                          | Not classified              |
| Corrosive to Metals                                                        | Classification not possible |

## HEALTH HAZARDS

|                                                               |                                                 |
|---------------------------------------------------------------|-------------------------------------------------|
| Acute Toxicity ( Oral )                                       | Classification not possible                     |
| Acute Toxicity ( Dermal )                                     | Classification not possible                     |
| Acute Toxicity ( Gases )                                      | Not classified                                  |
| Acute Toxicity ( Vapers )                                     | Classification not possible                     |
| Acute Toxicity ( Dusts and Mists )                            | Classification not possible                     |
| Skin Corrosion / Irritation                                   | Classification not possible                     |
| Serious Eye Damage / Eye Irritation                           | Classification not possible                     |
| Respiratory or Skin Sensitization                             | Classification not possible                     |
| Germ Cell Mutagenicity                                        | Classification not possible                     |
| Carcinogenicity                                               | Not classified                                  |
| Reproductive Toxicity                                         | Classification not possible                     |
| Specific Target Organ Systemic Toxicity ( Single Exposure )   | CATEGORY 3<br>( Transient target organ effect ) |
| Specific Target Organ Systemic Toxicity ( Repeated Exposure ) | CATEGORY 1 ( liver, lung )                      |
| Aspiration Hazard                                             | Classification not possible                     |

## ENVIRONMENTAL HAZARDS

|                                                  |                             |
|--------------------------------------------------|-----------------------------|
| Hazardous to The Aquatic Environment ( Acute )   | Classification not possible |
| Hazardous to The Aquatic Environment ( Chronic ) | CATEGORY 4                  |

## GHS LABEL ELEMENTS

Pictogram / Hazard Symbol

Exclamation mark Health hazard

Signal word

Danger

Hazard statement

Not for the product as a mixture, however reference can be made to the following for copper and tin.

•Copper

Stimulation of upper airway ( single exposure)

Liver disease ( long term or repeated exposure in a high aerial density )

Metal hume fever ( fume's inhalation )

•Tin

Liver disease ( long term or repeated exposure in a high aerial density )

Precautionary statement

Safety measure

Do not handle the product until reading and understanding all of notes concerning safety.

Inhale neither dust nor hume.

Avoid exposing with a protection tool (protective mask etc.) and ventilators.

Avoid the discharge into the environment.

First-aid measure

Do arrangements for medical treatment immediately. ( When the exposure or the anxiety exists. )

Storage

Avoid contact with chemical substances such as an acid, alkaline materials, and oxidants and the chlorides.

Disposal

Collect as a metal because the substance that composes the product is recyclable,  
and consign it to the disposal contractor.

## 3.COMPOSITION / INFORMATION ON INGREDIENTS

Single substance or mixture : mixture

Chemical name : Phosphor bronze alloy

Chemical formula or structural formula : Cu-Sn-P

CAS No. : Shown in table below

Official gazette notification reference No. : No reference

\*1 : Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements  
in Their Management

\*2 : Industrial Safety and Health Law

Alloy elements and content :

|                | Content (wt-%) | *1 | *2  | CAS No.   |
|----------------|----------------|----|-----|-----------|
| Copper (Cu)    | Balance        | -  | 379 | 7440-50-8 |
| Tin (Sn)       | 7. 0~9. 0      | -  | 322 | 7440-31-5 |
| Phosphorus (P) | 0. 03~0. 35    | -  | -   | 7723-14-0 |

## 4.FIRST AID MEASURES

In the situation in which the powder and dust, etc. are generated by the machining and grinding

Eye Contact : Wash the eye for 15minutes or more by a stream of clean water, and see a doctor.

Skin Contact : Wash the adhesion part by soapy water, and flush it with bags of water.

Inhaled : When inhaling voluminously, transfer the patient to a fresh place of air at once.  
The patient should be kept warm and at rest while a doctor is sent for.

Ingestion : Wash the mouth well with water and, if possible, induce vomiting, then immediately arrange for medical treatment.

In the situation handled with the product machined

Skin Contact : If heated chips, etc., adhere to your skin to cause a minor burn, immediately allow the affected part to cool under  
( Burn ) plenty of running water.

In the situation handled with the product melted

Inhaled : Transfer the patient to a fresh place of air at once.

Practice artificial respiration at once when breathing difficulties or asphyxia is perceived.

In the situation in which processed solution (wastewater etc.) by the etching etc. is generated

Eye Contact : Wash the eye for 15minutes or more by a stream of clean water, and see a doctor.

Skin Contact : Wash the adhesion part by soapy water, and flush it with bags of water.

Inhaled : When inhaling voluminously, transfer the patient to a fresh place of air at once.  
The patient should be kept warm and at rest while a doctor is sent for.

Ingestion : Wash the mouth well with water and, if possible, induce vomiting, then immediately arrange for medical treatment.

**5. FIRE FIGHTING MEASURES**

- Suitable extinguishing media : This product is not inflammable.  
Use a special, powdery extinguisher or dry sand. (Water is improper.)
- Peculiar extinction method : Extinguish fire by the fire extinguisher and water, etc. if the product has not melted.  
Do not pour water when melting so that there is fear of the steam explosion.
- Special protective equipment and precautions : Wear the protective clothing, and use the compressed air open-circuit SCBA,  
the compressed air closed-circuit SCBA.

**6. ACCIDENTAL RELEASE MEASURES**

- Personal precautions, protective equipment and emergency procedures : Not applicable for the solid.
- Environmental precautions : Not applicable for the solid.
- Methods and materials for containment and cleaning up : Not applicable for the solid.

**7. HANDLING AND STORAGE**

- Precautions for safe handling
- Put safety gloves on to protect your hands from edges of coils which might cut your hands.
  - Wear safety glasses when metal powders or chips are expected to be generated in the work.
  - Put safety shoes on when handling heavy coils.
  - Note the cut and the injury of eyes by the splash at the coil end so that there is a spring.
- Conditions for safe storage
- Storage should be a level ground. Avoid an inclining place and unstable accumulation to cause the collapse of cargo piles.
  - Do not allow acid, alkali, chloride, sulfide and other corrosive chemicals to come into contact with the product.
  - Avoid keeping in the place where humidity is high to prevent discoloration and rust.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

- Control parameters : Not provided
- Occupational exposure limit values or biological limit values : Not specified for the product as a mixture.  
Refer to the table below when Hume and the dust are generated.

| Unit mg/m <sup>3</sup> |                                                              |                            |
|------------------------|--------------------------------------------------------------|----------------------------|
| Substance              | Japan association Industrial Health<br>( recommended value ) | ACGIH (TLV)                |
| Copper                 | Not specified                                                | Time-Weighted Average      |
|                        |                                                              | Fume 0. 2                  |
|                        |                                                              | Dust 1. 0                  |
|                        |                                                              | Short term exposure limit  |
| Tin                    | Not specified                                                | Dust 2. 0                  |
|                        |                                                              | Time-Weighted Average      |
|                        |                                                              | Inorganic compound 2. 0    |
|                        |                                                              | Organic compound 0. 1      |
| Phosphorus             | 0. 1                                                         | Time-Weighted Average 0. 1 |

**Appropriate engineering controls :**

When the dust and Hume are generated, and the density cannot be maintained below the standard in the above table, it is necessary to do the facility measures such as the local exhaust systems.

**Personal protective equipment :**

In places where dust or fume concentration is high, wear the protective mask and safety glasses.  
Wear safety gloves when there is a possibility of injuring the hand and the finger.  
Wear provided work wear and safety shoes.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

|                                              |                                                                        |
|----------------------------------------------|------------------------------------------------------------------------|
| Physical state                               | : Metal                                                                |
| Appearance                                   | : Reddish Brown ( Lustrous solid )                                     |
| Odour                                        | : None                                                                 |
| pH                                           | : Data none                                                            |
| Melting point / freezing point               | : 1020°C ( Melting point )                                             |
| Initial boiling point and boiling range      | : Data none << Cu:2582°C (Boiling point), Sn:2625°C (Boiling point) >> |
| Flash point                                  | : Data none                                                            |
| Evaporation rate                             | : Data none                                                            |
| Flammability ( solid, gas )                  | : Data none                                                            |
| Upper/lower flammability or explosive limits | : Data none                                                            |
| Vapour pressure                              | : Data none                                                            |
| Vapour density                               | : Data none                                                            |
| Relative density                             | : 8. 8 (g/cm <sup>3</sup> )                                            |
| Solubility ( ies )                           | : Data none                                                            |
| Partition coefficient: n-octanol/water       | : Data none                                                            |
| Auto-ignition temperature                    | : Data none                                                            |
| Decomposition temperature                    | : Data none                                                            |

**10. STABILITY AND REACTIVITY**

|                                                        |                                                                                                                                       |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Chemical stability / Possibility of hazardous reaction | : This product is stabilized under a general environment, and reactivity is small.                                                    |
| Conditions to avoid                                    | : Avoid contact with chemical substances such as an acid, alkaline materials, and oxidants and the chlorides.                         |
| Incompatible materials                                 | : The acetylene unites with copper, silver, gold, and other metal ions, and generates the compound with extremely high explosiveness. |
| Hazardous decomposition product                        | : This product might generate hydrogen reacting with the acid or the hydroxide alkali.                                                |

**11. TOXICOLOGICAL INFORMATION**

Hazard information is not reported as this compound (alloy).

Hazard information below concerns the individual elements that composes this alloy.

|                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Acute toxicity ( Including lethal dose 50% )                  | : Copper powders LD50 orally administered--mouse >4000mg/kg <sup>2)</sup><br>The symptom of the acute toxicity when swallowing is nausea, vomiting, weakness.<br>The symptom when inhaling the dust and Hume is the cough, breast pain, and the fever.<br>Yellow phosphorus is the most toxic for phosphorus. The symptom of the acute toxicity is the angiopathy, the hepatization (yellow atrophy of the liver), the nausea, the vomit, the diarrhea, the steatosis of liver and kidney, the hypertrophy of liver, the jaundice, the hematuria, the dyspnoea. |
| Skin Corrosion / Irritation                                   | : The cutaneous sensitization might be caused unusually. (copper).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Serious Eye Damage / Eye Irritation                           | : Data none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Respiratory or Skin Sensitization                             | : Copper is classified into the second crowd of skin sensitization (Material which might have sensitization to person) by the Japan Society for Occupational Health (Recommendation;2004).                                                                                                                                                                                                                                                                                                                                                                      |
| Germ Cell Mutagenicity                                        | : Data none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Carcinogenicity                                               | : Copper is classified into D (material that cannot be classified into human carcinogenicity) by EPA(1991).                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Reproductive Toxicity                                         | : Data none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Specific Target Organ Systemic Toxicity ( Single Exposure )   | : The Hume of copper stimulates the upper air way. <sup>5)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Specific Target Organ Systemic Toxicity ( Repeated Exposure ) | : The appearance of the hepatomegalia was detected of the worker who had been exposed to a high aerial density of copper. <sup>7)</sup><br>( Presumption intake 200mg/day )<br>The appearance of the pneumoconiosis was detected of the worker who handled metallic tin. <sup>8)</sup><br>The symptom of the phosphorous chronic intoxication is the anorexia, the dispepsia, the loss weight, the anemia, the jaundice, the mucosal bleeding, the urine protein, the yellowed augen of eyes, the intraretinal hemorrhage.                                      |
| Aspiration Hazard                                             | : Data none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**12.ECOLOGICAL INFORMATION**

Ecotoxicity : Data none  
Persistence and degradability : Data none  
Bioaccumulative potential : Data none  
Mobility in soil : Data none

**13.DISPOSAL CONSIDERATIONS**

Waste residues, contaminated packaging : Collect as a metal because the substance that composes the product is recyclable, and consign it to the disposal contractor.

**14.TRANSPORT INFORMATION**

UN number, UN proper shipping name : Not applicable  
Transport hazard class : Not applicable  
Packing group : Not applicable  
Marine pollutant : No  
Special precautions : Prevent surely the fall and the collapse of piles.  
Avoid rain water, the sea breeze, and seawater, by covering with sheet or other precautions.

**15.REGULATORY INFORMATION**

Industrial Safety and Health Law : Hazardous substance to be notified. <Copper, Tin>  
« Article 57-2(Law) Attached Table 9, Article 18-2(Enforcement Order of Law) »  
Water Pollution Control Law : Substance to which effluent standard is provided. <Copper>  
« Article 3(Law) Attached Table 2, Article 1(Ministerial ordinance that provides effluent standard) »  
Sewage Law : Substance to which effluent standard is provided. <Copper>  
« Article 12-2(Law) Article 9-4(Enforcement Order of Law) »  
Situation in which dust is generated : Industrial Safety and Health Law « Paragraph 1, Article 2(Ordinance on Prevention of Hazards Due to Dust) »  
Act of the Occupational Safety and Health Administration (OSHA).

**16.OTHER INFORMATION ( Cited document etc. )**

Cited document

- 1) Dictionary of metallurgical terminology ( the Japan Institute of Metals )
- 2) Copper and Copper Alloy Fundamentals and Industrial Technology, Revised Edition ( Japan Brass Makers Association )
- 3) JIS Handbook, Nonferrous Materials ( Japan Industrial Standards )
- 4) Metal Data Book ( Maruzen )
- 5) ACGIH Documentation of the threshold limit values for chemical substances ( 7th edition, 2001 )
- 6) A Handbook on the dangers and Hazards of Chemical Substances, Revised, 4th Edition ( Japan Industrial Safety and Health Association )
- 7) Environmental Health Criteria 200 ( World Health Organization Geneva 1998 )
- 8) Environmental Health Criteria 15 ( World Health Organization Geneva 1980 )
- 9) Classification and Labelling of Chemicals ( National Institute of Technology and Evaluation )
- 10) International Chemical Safety Cards -Japanese Version ( National Institute of Health Sciences )
- 11) Iwanami's Dictionary of Physic chemistry, 4th Edition ( Iwanami Shoten )
- 12) Copper Alloy Data Book ( Japan Copper and Brass Association )

Reference URL : <http://www.copper-brass.gr.jp/> ... Japan Copper and Brass Association

*The Material Safety Data Sheet (MSDS) is designed as a reference information to assist safe handling of the dangerous and hazardous substance by the agent.*

*When the product is handled, it is necessary to understand that handling agents are requested to take appropriate measures on their own responsibility for the individual handling operations.*

*And, this safety data sheet is not a written guarantee of safety.*

# Material Safty Data Sheet

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Company Name : HARADA METAL INDUSTRY CO., LTD.  
 Address : 5-9-25 HONCHO, TODA-SHI SAITAMA 335-0023, JAPAN  
 Charge Section : Quality Assurance Division Person in charge : KAZUHIRO KOSAKA  
 Tel. : '+81-48-441-5113 FAX. : '+81-48-441-2058  
 Urgent call : Quality Assurance Division Tel. : '+81-48-441-5113  
 Revision date : 2011/11/9 Issue date : 2013/5/13

1. Product name: Phosphor bronze plates and strips (JIS H3110(2006) Alloy No. C5050, C5111, C5102, C5191, C5212)  
 Phosphor bronze plates and strips for spring (JIS H3130(2006) Alloy No. C5210), C5240

## 2. Composition, Ingredient Information

Constitution element : Copper, Tin, Phosphor

Ingredient and content ( Impurities : Pb, Fe, Zn )

| Chemical ingredient | Content (wt.%) |           |           |           |           |           |           | CAS No.   |
|---------------------|----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                     | C5240          | C5210     | C5212     | C5191     | C5102     | C5111     | C5050     |           |
| Cu                  | Rem.           | Rem.      | Rem.      | Rem.      | Rem.      | Rem.      | Rem.      | 7440-50-8 |
| Sn                  | 9.0~11.0       | 7.0~9.0   | 7.0~9.0   | 5.5~7.0   | 4.5~5.5   | 3.5~4.5   | 1.0~1.7   | 7440-31-5 |
| P                   | 0.03~0.35      | 0.03~0.35 | 0.03~0.35 | 0.03~0.35 | 0.03~0.35 | 0.03~0.35 | 0.15 max. | 7723-14-0 |
| Pb                  | 0.02 max.      | 0.02 max. | 0.02 max. | 0.02 max. | 0.02 max. | 0.02 max. | 0.02 max. | 7439-92-1 |
| Fe                  | 0.10 max.      | 0.10 max. | 0.10 max. | 0.10 max. | 0.10 max. | 0.10 max. | 0.10 max. | 7439-89-6 |
| Zn                  | 0.20 max.      | 0.20 max. | 0.20 max. | 0.20 max. | 0.20 max. | 0.20 max. | 0.20 max. | 7440-66-6 |

Chemical formula or Constitutional formula : Cu—Sn—P

Official daily gazette public announcement reference number (CSCL, ISHL) : Non-pertinence

CAS No. : Ref. Upper table

UN classification and UN number : Non-fall under dangerous materials in the definition of the UN

## 3. Dangerous Noxious Kind

Name of the kind : There is not it for a product.

Danger : No

Hazardous property : Cause metal fever and respiratory stimulation symptom when inhale Hume.

## 4. First aid step

When it processed a product, and powder, earthly affairs occurred.

When it was in the eyes : Wash eyes with clean water calmly for minimum 15 minutes and take a medical advice immediately.

When stuck to skin : Wash adhesion department with soapy water and wash it away with a large quantity of water.

When inhaled it : When inhaled it abundantly, move a patient to the place where the air is fresh promptly, rest quietly, keep warm and take a medical advice immediately.

When it processes a product

When burnt skin with a product : Cool the part with a large quantity of water in the case of the slight burn at the time of heat-treatment promptly. Consult the doctor in the case of the severe burn promptly.  
 processing

When a product is processed in the shape of a tip and may swallow it

When swallowed it : When swallowed it abundantly, wash in the mouth with water and take a medical advice immediately.

# Material Safty Data Sheet

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## 5. Step at the time of the fire

Fire extinguishing method : Not apply it for noninflammability

Digestive : Not apply it for noninflammability

## 6. Step at the time of the leak

Not apply it for solid

## 7. Handling and attention in the storage

Handling : Because there is danger to cut a hand in the edge of the product, cannot touch it barehanded.

When the powder expired at the time of the cut, not be in the eyes and not breathe it.

Because it is heavy goods, there is the danger of the fall and warns the handling enough.

Because there are spring characteristics, warn the coil end splashes, and not to be hurt.

Storage : Do not let come in contact with the chemical substance such as strong acid and alkali.

Keep it on the flat place. Because cause the collapse of cargo, be careful to accumulation.

## 8. Revelation hedge

Management density : Not prescribed

Permission density : No rule as the product, but refers to a list shown below when Hume/mine dust occurs.

Unit: mg/m<sup>3</sup>

| Element | Advice level of the Nihon Sangyo hygiene society | ACGIH(TLV)                     | OSH (PEL) |
|---------|--------------------------------------------------|--------------------------------|-----------|
| Cu      | No rule                                          | Time Weighted Average          | Fume 0. 1 |
|         |                                                  | Fume 0. 2                      |           |
|         |                                                  | Mine dust 1. 0                 |           |
|         |                                                  | Short term exposure limit      |           |
| Sn      | No rule                                          | Mine dust 2. 0                 |           |
|         |                                                  | Time Weighted Average          |           |
|         |                                                  | Inorganic compound 2. 0        |           |
|         |                                                  | Organic compound 0. 1          |           |
|         |                                                  | Short term exposure limit      |           |
| P       | 0. 1                                             | Inorganic compound 4. 0        |           |
|         |                                                  | Organic compound 0. 2          |           |
|         |                                                  | Time Weighted Average 0. 1     |           |
|         |                                                  | Short term exposure limit 0. 3 |           |

Anti-faciliti es measure : Be unnecessary, but it is usually desirable to perform the facilities measures such as local exhausts when mine dust or Hume occur, and it cannot maintain density less than a standard.

Protection tool : When mine dust, small tip, lathe waste or powder occurs at the time of product processing, wear protection mask and protection glasses.

When may be damaged for fingers, wear gloves to protect the fingers.

Wear the established working clothes and safety boots.

# Material Safty Data Sheet

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## 9. Physics and chemical property

Appearance : Red solid which there is luster  
 Smell : No smell  
 Boiling point : Cu 2630°C、Sn 2275°C、P —  
 Solubility : Not dissolve in water

Property according to the alloy

|                         | C5240  | C5210  | C5212  | C5191  | C5102  | C5111  | C5050  |
|-------------------------|--------|--------|--------|--------|--------|--------|--------|
| Specific gravity        | 8.78   | 8.82   | 8.82   | 8.85   | 8.88   | 8.89   | 8.90   |
| Melting point(Liquidus) | 1000°C | 1020°C | 1020°C | 1045°C | 1050°C | 1060°C | 1075°C |

## 10. Danger information (Stability / Reactivity)

Flash point : —°C  
 Ignition point : —°C  
 Explosion range : No explosion range  
 Stability, Reactivity : Inert and Stable

## 11. Noxious information ( Case about the person and epidemiologic information)

Because no noxious information as the alloy, describe below the noxious information of the simple substance element to constitute.

Corrosive for skin : No data  
 Pungency (For skin and eye) : The copper rarely causes contact-related cutitis.  
 Acute toxicity (including LD-50) : Copper powder LD50 Oral mouse >4000mg/kg、A symptom of the acute intoxication such as nausea, vomiting and the feeling of weakness comes out when swallow it. A cough, pain in the chest, a fever attack is caused when breathe in mine dust and Hume. There is extremely little toxicity of tin.  
 Yellow phosphorus is the toxic about phosphorus. As a symptom of the acute intoxication, there are vasculopathy, quality of hepatization (yellow liver atrophy), feeling like vomiting, vomiting, diarrhea, the fatty degeneration of the liver, the kidney, liver enlargement, jaundice, hematuria, dyspnea.  
 Nubacute toxicity : No data  
 Chronic toxicity : It becomes the tin storage disease when I inhale mist mine dust of tin for a long term, but there is not the pulmonary slow-up. An appetite decline, indigestion, a weight loss, anemia, jaundice, mucous membrane bleeding, proteinuria, the conjunctiva of eyes include bleeding on yellowing, retina as a symptom of the chronic poisoning of phosphorus.  
 Original cancer characteristics : No  
 Original variation characteristics : No  
 (Microbe, Chromosome aberration)  
 Reproduction toxic : No  
 Teratogenicity : No  
 Others (etc. outbreak of the poisonous gas) : No

## 12. Environmental influence information

Resolvability : No data  
 Accumulation characteristics : No data  
 Toxicity for the fish : TLm(Cu ppm) CuSO<sub>4</sub> 48hr Rainbow trout 0. 038~0. 8ppm  
 Others : No data

| Material Safty Data Sheet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4 / 4 Page |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| 13. Attention in the transport<br>When transport by vehicle, be careful not to get wet for rainwater. Prevent a fall, collapse of cargo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |
| 14. Attention in the disposal<br>Entrust recycling supplier.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |
| 15. Application laws and ordinances<br>Particularly no<br>When mine dust occurs : Dust obstacle Ordinance on Prevention Article 2 Clause 1 of the Occupational Safety and Health Act<br>OSHA(Occupational Safety & Health Admin istration)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |
| 16. Others(The reference of mention contents, references cited)<br>Reference : HARADA METAL INDUSTRY CO., LTD. QUALITY ASSURANCE DIVISION<br>References cited : Metal glossary of terms (metal society)<br>: Danger, harmful manual of the chemical substance revision 4 (Association of prevention of central work-related accident)<br>:Manual addicted to industry Enlarged edition (Medicine tooth medicine publication Co., Ltd.)<br>: Dangerous materials handbook (Maruzen publication)<br>: 100 kinds of main chemical articles toxic data special report (Foreign countries technical data research institute Co., Ltd.)<br>: Iwanami physics and chemistry dictionary revision 3 enlarged edition (Iwanami Shoten)<br>: The basics and engineering of copper and the copper compound metal Revised edition (Japan copper and brass association)<br>: STANDARDS HANDBOOK Part2—Alloy Data Eight Edition 1985 (COPPER DEVELOPMENT ASSOCIATION)<br>: SAX'S DANGEROUS PROPERTIES OF INDUSTIEL MATERIALS<br>: Dangerous noxious indication system of a plain chemical substance (The Department of Labor Industrial Safety and Health Department chemical substance Security Research Division)<br>: JIS handbook Non-Ferrous Metals & Metallurgy (Japan Standards Association)<br>: Metal data book (Maruzen publication)<br>: A list of carcinogens and list of sensitization-related materials<br>* Japanese : The classification of the carcinogen and the standard — List of carcinogens — (Japanese chemical substance security, clearing house C0., Ltd. 1992)<br>* Ehglsh : JARC Monographs of the Evaluation of Car cinogenic Risk of Chemicals to Humans. vol. 1~54 (1973~) Supplemen (1988) |            |
| We make the mention content based on a document, information, data available at present, but, about the contents, are not a thing forming any guarantee. We ask after we refer to these when we handle it, and having understood that it is necessary to take appropriate measures depending on the actual situation such as the individual handling in the responsibility of the handler so that it is utilized.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |

## Material Safety Data Sheet

Attached sheet

## GHS Classification

## ① Copper

## Physicochemical risk

Explosives Not applicable

Combustibility, flammable gas

Not applicable

Combustibility, flammable aerosol

Not applicable

Combustion Enhancing gas • oxidized gas

Not applicable

High Pressure Gas

Not applicable

inflammable liquid

Not applicable

Flammable Solid

Not classify

Self-reactive substance and mixture

Not applicable

Spontaneous - ignitable liquid

Not applicable

Spontaneous - ignitable solid

Not applicable

Substances and mixture liable to spontaneous

Not classify

Substances which, in contact with water, emit flammable gases

Not classify

Oxidizing liquid

Not applicable

Oxidizing solid

Not applicable

Organic peroxides

Not applicable

Metal corrosives substances

Not classify

## Hazardousness for the health acute toxicity (oral)

Not classify

acute toxicity (skin)

Not classify

acute toxicity (Breathe in : Gas)

Not applicable

acute toxicity (Breathe in : Steam)

Not classify

acute toxicity (Absorption : Fine particles)

Not classify

acute toxicity (Breathe in : Mist)

Not classify

Skin irritation

Not classify

Serious injury characteristics for eyes • eye irritation

Not classify

Respiratory organs sensitization

Not classify

Skin sensitization

Not classify

Germ - cell mutagenicity

Not classify

Carcinogenic

Not applicable

Reproduction toxicity

Not classify

Specific Target Organ • Systemic toxicity (Single exposure)

Category 3 (respiratory tract irritation)

Symbol



Specific Target Organ • Systemic toxicity (Repeated exposure)

Category 1 (Liver)

Symbol



## Environmental hazards

Aspiration hazards

Not classify

Aquatic toxicity (acute)

Not classify

Aquatic toxicity (chronic)

Category 4

No symbol

② Tin

|                              |                                                               |                |                                                                                       |
|------------------------------|---------------------------------------------------------------|----------------|---------------------------------------------------------------------------------------|
| Physicochemical risk         | Explosives                                                    | Not applicable |                                                                                       |
|                              | Combustibility, flammable gas                                 | Not applicable |                                                                                       |
|                              | Combustibility, flammable aerosol                             | Not applicable |                                                                                       |
|                              | Combustion Enhancing gas • oxidized gas                       | Not applicable |                                                                                       |
|                              | High Pressure Gas                                             | Not applicable |                                                                                       |
|                              | inflammable liquid                                            | Not applicable |                                                                                       |
|                              | Flammable Solid                                               | Not classify   |                                                                                       |
|                              | Self-reactive substance and mixture                           | Not applicable |                                                                                       |
|                              | Spontaneous - ignitable liquid                                | Not applicable |                                                                                       |
|                              | Spontaneous - ignitable solid                                 | Not applicable |                                                                                       |
|                              | Substances and mixture liable to spontaneous                  | Not classify   |                                                                                       |
|                              | Substances which, in contact with water, emit flammable gases | Not classify   |                                                                                       |
|                              | Oxidizing liquid                                              | Not applicable |                                                                                       |
|                              | Oxidizing solid                                               | Not applicable |                                                                                       |
|                              | Organic peroxides                                             | Not applicable |                                                                                       |
|                              | Metal corrosives substances                                   | Not classify   |                                                                                       |
| Hazardousness for the health | acute toxicity (oral)                                         | Not classify   |                                                                                       |
|                              | acute toxicity (skin)                                         | Not classify   |                                                                                       |
|                              | acute toxicity (Breathe in : Gas)                             | Not applicable |                                                                                       |
|                              | acute toxicity (Breathe in : Steam)                           | Not classify   |                                                                                       |
|                              | acute toxicity (Absorption : Fine particles)                  | Not classify   |                                                                                       |
|                              | acute toxicity (Breathe in : Mist)                            | Not classify   |                                                                                       |
|                              | Skin irritation                                               | Not classify   |                                                                                       |
|                              | Serious injury characteristics for eyes • eye irritation      | Not classify   |                                                                                       |
|                              | Respiratory organs sensitization                              | Not classify   |                                                                                       |
|                              | Skin sensitization                                            | Not classify   |                                                                                       |
|                              | Germ - cell mutagenicity                                      | Not classify   |                                                                                       |
|                              | Carcinogenic                                                  | Not applicable |                                                                                       |
|                              | Reproduction toxicity                                         | Not classify   |                                                                                       |
|                              | Specific Target Organ • Systemic toxicity (Single exposure)   | Not classify   |                                                                                       |
|                              | Specific Target Organ • Systemic toxicity (Repeated exposure) |                |                                                                                       |
|                              | Category 1 (Lung)                                             |                |                                                                                       |
|                              |                                                               | Symbol         |  |
| Environmental hazards        | Aspiration hazards                                            | Not classify   |                                                                                       |
|                              | Aquatic toxicity (acute)                                      | Not applicable |                                                                                       |
|                              | Aquatic toxicity (chronic)                                    | Not applicable |                                                                                       |
|                              |                                                               | No symbol      |                                                                                       |

# 产品安全检测报告

|      |                   |    |          |
|------|-------------------|----|----------|
| 报告编号 | MSDS 3604         | 页数 | 1 OF 4   |
| 产品编号 | JIS H3250 C3604BD | 日期 | 2017-5-2 |

## 1. 供应商介绍:

物品中(英)文名称: 黄铜 (BRASS ALLOY)

物品代号: C3604

化学名称: Cu-Zn-Pb金属合金

类别: 金属混合物

公司名: 苏州生富科技金属材料有限公司

地址: 江苏省太仓市沙溪镇工业开发区

电话: 0512-53226699

传真: 0512-53226638

## 2. 化学成份:

| 名称    | Cas 号     | 成分范围(%)   | 实测(%)   | 备注 |
|-------|-----------|-----------|---------|----|
| 铜(Cu) | 7440-50-8 | 57.0-61.0 | 57.563  |    |
| 锌(Zn) | 7440-66-6 | —         | 38.7408 |    |
| 铅(Pb) | 7439-92-1 | ≤3.7      | 3.053   |    |
| 铁(Fe) | 7439-89-6 | ≤0.50     | 0.169   |    |
| 锡(Sn) | 7440-31-5 | —         | 0.255   |    |
| 镍(Ni) | 7440-02-0 | —         | 0.183   |    |
| 铋(Bi) | 7440-69-9 | —         | 0.035   |    |
| 镉(Cd) | 7440-43-9 | ≤50ppm    | 0.0012  |    |

OHSA: 本产品 in 固态时不具危险性。其粉尘及烟雾: 具有危害性。另其含有重金属铅长时间接触会对人体有一定的危害。

## 3. 危害辨认资料:

### \* 警告:

长时间暴露于粉尘及烟雾的工作环境下, 对于眼睛、呼吸系统、皮肤会造成刺激伤害, 必须配戴保护器具。包括护目镜、适当衣物、必须要保护全部身体。身体接触之部位, 必须彻底清洗干净。

|             |                                          |
|-------------|------------------------------------------|
| 种类的名称       | 铜、锌、铅之混合物                                |
| 危险标示类别      | 金属粉尘火烟雾将对皮肤、眼睛造成刺激性且对肺具有毒性, 但金属成品本身不具危害性 |
| 危害级数(粉尘及烟雾) | 健康: 1; 可燃: 0 (0=低、4=极高)                  |

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4. 急救措施：

\* 对于粉尘及烟雾危害：

|      |                                          |
|------|------------------------------------------|
| 眼睛接触 | 以大量清水冲洗上下眼皮内部（至少15分钟），若眼睛被刺激不适者，立即送医院检查。 |
| 食入时  | 大量喝水并催吐，迅速送医院检查                          |
| 皮肤接触 | 以清水清洗干净                                  |
| 吸入时  | 送至通风良好较阴凉处休息，以毛布保暖，严重者迅速送医院检查诊断          |

5. 火灾及爆炸危害资料：

- \* 黄铜等为非燃性资材，不会起火燃烧，唯包装资材多数为可燃物。
- \* 起火燃烧时，用一般灭火器材灭火即可，无一般限定。
- \* 注意：粉尘可能导致爆炸或产生可燃气体

6. 溢漏时之处置：

- \* 本产品在加工时产生粉尘时，有可能产生爆炸，必须将火源移除，也惟有粉尘型时才可能产生泄漏，所以必须装设吸尘装置，过滤空气中之粉尘，以降低其粉尘浓度。
- \* 泄漏于空气、水、地面中均不适用。

7. 取用及储运方式：

取用注意事项

- \* 重摔易造成材料弯曲变形，取用时注意。
- \* 轧延产品之端面易割伤皮肤应小心取用。
- \* 切削加工时会产生粉尘应小心眼睛，皮肤及呼吸应配戴保护器具。
- \* 小心粉尘不可泄漏在空气中。
- \* 需注意产品有翻倒之危险性易造成压伤，吊运时要十分注意。
- \* 打包带剪除时，小心其端部会弹起，对人员之身体、皮肤及眼睛造成割伤。
- \* 衣物或器具上之粉尘应以水洗或吸尘器清洁，不可用拍打或其他方式处理。

储存条件

- \* 仓库最高允许温度：无
- \* 避免放置于潮湿或酸/碱/含硫/含氨气体之场所。

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8. 人员暴露防护措施：

| Cu暴露标准  |                                                  | OHSА (PEL) |     | ACGIH (TLV) |     |       |
|---------|--------------------------------------------------|------------|-----|-------------|-----|-------|
|         |                                                  |            | ppm | mg/m3       | ppm | mg/m3 |
|         | 烟雾                                               |            | 无   | 0.1         | 无   | 0.2   |
|         | 粉尘                                               |            | 无   | 1           | 无   | 1     |
| Zn暴露标准  |                                                  | OHSА (PEL) |     | ACGIH (TLV) |     |       |
|         |                                                  |            | ppm | mg/m3       | ppm | mg/m3 |
|         | 粉尘                                               |            | 无   | 无           | 无   | 无     |
| Pb暴露标准  |                                                  | OHSА (PEL) |     | ACGIH (TLV) |     |       |
|         |                                                  |            | ppm | mg/m3       | ppm | mg/m3 |
|         | 粉尘                                               |            | 无   | 无           | 无   | 无     |
| 呼吸防护    | 长时间暴露于粉尘及烟雾的工作环境下, 需要呼吸防护器具, 配戴NIOSH认识防护口罩       |            |     |             |     |       |
| 通风防护    | 工作场所中, 若是会产生烟雾及粉尘时, 必须要有通风设备装置及集尘装置, 且工作中不可饮酒及抽烟 |            |     |             |     |       |
| 眼睛及皮肤防护 | 需要配护目镜, 防护手套防止割伤                                 |            |     |             |     |       |
| 人员防护    | 作业时应着适当之工作服及安全鞋                                  |            |     |             |     |       |

9. 物理性及化学性说明：

- \* 外观:黄色光泽的固态金属
- \* 熔点:830-900℃
- \* 比重:8.5
- \* 蒸汽压:不适用
- \* 溶解度:不适用
- \* PH值25℃: 不适用

10. 安定性反应性之说明：

- \* 依使用环境之不同，安定性并非100%。
- \* 为非耐酸性材质，与酸性物接触时会起化学作用。

11. 毒性资料：

来源途径：

- \* 粉尘：食入、皮肤接触、吸入、眼睛接触
- \* 烟雾吸入，眼睛接触，皮肤接触
- \* 本产品的成品不具毒性

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重物毒性：本合金产品不具毒性

其单一成分之毒性说明如下供参考：

- \* 皮肤腐蚀性：无此资料
- \* 刺激性（皮肤、眼睛）：铜产品会产生接触性皮肤炎，锌对眼睛有危害性
- \* 急性毒性：铜的粉末经口食入，会有急性中毒症状：呕吐，无力感及胃疼，粉尘吸入过多，会有胸痛，发烧症状。
- \* 粉尘、烟雾会让原有气喘、肺气肿之病加重。

## 12. 生态资料：

本产品的成品对生态不具毒性

- \* 分解性：无资料
- \* 蓄积性：无资料
- \* 突变性：本产品没有资料显示会造成突变性
- \* 鱼毒性：水中的铜浓度在0.015-3.0mg/l，尤其在软水中，会有报告会对许多种类鱼，甲壳类的动物及软体动物，浮游生物具有毒性。

## 13. 废弃处理

- \* 本产品不属于危害性废弃物，须丢弃时可以委托回收商予以回收再生处理。

## 14. 运输资料：

- \* 运送时本产品不要直接与水接触，并且要注意会有滑落、翻落的危险发生。

## 15. 法规资料：

- \* 通常无特定法令规定但是在会产生粉尘的场所必须遵守劳工安全卫生法劳工工作环境空气中有害物质容许浓度标准  
USA/OHSA:Occupational Safety &Health Administration  
USA/ACGIH Guide to protective Clothing.Cincinnati,OH:American Conference of Government Industrial Hygienists,1987  
USA/SARA313;ROHS;WEEE

## 16. 其它资料：

- \* 本MSDS内容资料应被所有使用、运送、储存或暴露于本产品之公司/人员充分了解与接受并将其应用于使用、加工、制造或管理与本产品有关之作业规定上，本MSDS资料内容在编订时已尽可能将最新资料纳入，但对所有内容不予以任何保证。

# 化学品安全技术说明书（聚四氟乙烯）

## 第一部分：化学品名称及企业标识

化学品中文名称：聚四氟乙烯  
化学品俗名或商品名：聚四氟乙烯  
化学品英文名称：polytetrafluoroethylene  
企业名称：东莞市昶博电子材料有限公司  
地址：东莞市石龙镇王屋洲工业区标准厂房A座  
邮编：523000  
传真号码：0769-81732188  
企业应急电话：0769-81732181  
技术说明书编码：DY-99  
生效日期：2017年9月12日

## 第二部分：成分/组成信息

纯品 ☒

混合物 ☐

化学名称：聚四氟乙烯

| 有害物成分 | 含量 |
|-------|----|
| 聚四氟乙烯 |    |

CAS No.  
9002-84-0

## 第三部分：危险性概述

危险性类别：

侵入途径：

**健康危害：**本品基本无毒，但聚四氟乙烯的热解物组分，含量和毒性常随着加热温度的升高而增加和增高。吸入热分解产物可引起中毒。中毒轻者表现为发热和“感冒样”症状；重者出现呼吸道刺激症状，出现化学性支气管炎、肺炎，甚至发生肺水肿及心肌损害等。长期低浓度接触其热解产物者，常出现头痛、头昏、失眠、恶梦、记忆力减退、乏力、腰酸背痛等。

**环境危害：**

**燃爆危险：**本品可燃。

## 第四部分：急救措施

**皮肤接触：**无资料

**眼睛接触：**无资料

**吸入：**迅速脱离现场至空气新鲜处。保持呼吸道通畅。如呼吸困难，给输氧。如呼吸停止，立即进行人工呼吸。就医。

**食入：**无资料

## 第五部分：消防措施

**危险特性：**粉体与空气可形成爆炸性混合物，当达到一定浓度时，遇火星会发生爆炸。受热分解放出有毒的氟化物气体。

**有害燃烧产物：**一氧化碳、二氧化碳、氟化氢。

**灭火方法及灭火剂：**切断气源。若不能切断气源，则不允许熄灭泄漏处的火焰。喷水冷却容器，可能的话将容器从火场移至空旷处。雾状水、普通泡沫、干粉。

**灭火注意事项：**尽可能将容器从火场移至空旷处。灭火剂：雾状水、泡沫、干粉、二氧化碳、砂土。

## 第六部分：泄漏应急处理

**应急处理：**隔离泄漏污染区，限制出入。切断火源。建议应急处理人员戴防尘面具（全面罩），穿一般

作业工作服。避免扬尘，小心扫起，置于袋中转移至安全场所。若大量泄漏，用塑料布、帆布覆盖。收集回收或运至废物处理场所处置。

### 第七部分：操作处置与储存

**操作注意事项：**密闭操作。密闭操作，提供良好的自然通风条件。操作人员必须经过专门培训，严格遵守操作规程。建议操作人员佩戴自吸过滤式防尘口罩。远离火种、热源，工作场所严禁吸烟。使用防爆型的通风系统和设备。避免产生粉尘。避免与氧化剂接触。搬运时要轻装轻卸，防止包装及容器损坏。配备相应品种和数量的消防器材及泄漏应急处理设备。倒空的容器可能残留有害物。

**储存注意事项：**储存于阴凉、通风的库房。远离火种、热源。应与氧化剂分开存放，切忌混储。配备相应品种和数量的消防器材。储区应备有合适的材料收容泄漏物。

### 第八部分：接触控制/个体防护

最高容许浓度：无资料

中国 MAC( $\text{mg}/\text{m}^3$ )：未制定标准

前苏联 MAC( $\text{mg}/\text{m}^3$ )：10

**监测方法：**

**工程控制：**严加密闭，提供充分的局部排风和全面通风。

**呼吸系统防护：**空气中粉尘浓度较高时，佩戴自吸过滤式防毒面具（半面罩）。

**眼睛防护：**必要时，戴化学安全防护眼镜。

**身体防护：**穿一般作业防护工作服。

**手防护：**戴一般作业防护手套。

**其他防护：**工作现场严禁吸烟。保持良好的卫生习惯。

### 第九部分：理化特性

外观与性状：纯品。

PH 值：无资料

熔点( $^{\circ}\text{C}$ )：327

沸点( $^{\circ}\text{C}$ )：无资料

相对密度(水=1)：2.25

相对蒸气密度(空气=1)：无资料

饱和蒸气压(kPa)：无资料

燃烧热( $\text{kJ}/\text{mol}$ )：无资料

临界温度( $^{\circ}\text{C}$ )：无资料

临界压力(MPa)：无资料

辛醇/水分配系数的对数值：无资料

闪点( $^{\circ}\text{C}$ )：无资料

引燃温度( $^{\circ}\text{C}$ )：670（粉云）

爆炸上限%(V/V)：无资料

爆炸下限%(V/V)：无资料

溶解性：不溶于水。

主要用途：广泛用于电子、电气工业、化学工业、机械工业、航空工业等尖端科学技术和军事工业等。

### 第十部分：稳定性和反应活性

稳定性：稳定

禁配物：强氧化剂、易燃或可燃物。

避免接触的条件：无资料

聚合危害：

分解产物：全氟异丁烯

### 第十一部分：毒理学资料

急性毒性：LD<sub>50</sub>：无资料

LC<sub>50</sub>：164000mg/m<sup>3</sup>，4 小时(大鼠吸入)

刺激性：无资料

### 第十二部分：生态学资料

生态毒性：无资料

生物降解性：无资料

非生物降解性：无资料

其它有害作用：无资料。

### 第十三部分：废弃处置

废弃物性质：☒ 危险废物 ☐ 工业固体废物

废弃处置方法：按照国家有关规定处理。

废弃注意事项：

### 第十四部分：运输信息

危险货物编号：无资料

UN 编号：无资料

包装标志：

包装类别：Z01

包装方法：无资料

运输注意事项：起运时包装要完整，装载应稳妥。运输过程中要确保容器不泄漏、不倒塌、不坠落、不损坏。严禁与氧化剂等混装混运。运输途中应防曝晒、雨淋，防高温。

### 第十五部分：法规信息

法规信息：危险化学品安全管理条例 (2002年3月15日国务院发布)，化学危险物品安全管理条例实施细则 (化劳发[1992] 677 号)，工作场所安全使用化学品规定 ([1996]劳部发 423 号)等法规，针对化学危险品的安全使用、生产、储存、运输、装卸等方面均作了相应规定。

### 第十六部分：其他信息

参考文献：1、《危险化学品名录》（2002 年版）

2、《常用危险化学品的分类及标志》（GB 13690-92）

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# 永艺发金属制品(深圳)有限公司

物质安全资料表

Material Safety Data Sheet

## 一、化学品与厂商资料

物品名称：镀金槽液

化学名称：化学混合物

制造商或供应商名称：永艺发金属制品(深圳)有限公司

地址：深圳宝安区松岗镇江边第三工业区创业三路14号11栋2C

紧急联络电话：0755-33181901 /传真电话0755-81734903

## 二、危险性概述

物品危害分类：皮肤过敏第一级、致癌性第1A级。

标识内容：

符号：



警示语：警告、危险

危害警告讯息：可能造成皮肤过敏

可能致癌

危害防范措施：若与眼睛接触，立刻以大量清水洗涤后咨询医疗

避免吸入灰尘、烟雾、气体、液滴、蒸汽、喷雾

穿戴适当的防护衣物、手套、戴眼镜/护面罩

紧盖容器

其他危害：

特殊危害：

## 三、成分/组成信息

| 危害性成分 | 所占百分比 (%) | 化学文摘社<br>登记号码<br>CAS NO. |  |  |
|-------|-----------|--------------------------|--|--|
| 纯水    | 99.985%   | —                        |  |  |
| 氰化亚金钾 | 0.015%    | 13967-50-5               |  |  |
|       |           |                          |  |  |

## 四、急救措施

不同暴露途径之急救方法：

吸入：1. 若发生危害效应时，应将患者移到空气新鲜处。

2. 若无呼吸，立刻进行人工呼吸。

3. 若呼吸困难，由受过训练且合格的人供给氧气。

4. 立即就医。

皮肤接触：1. 将受到污染的衣物和靴子移除，用水和肥皂清洗患部15分钟以上。

2. 立即就医。

3. 受污染衣物和靴子欲再次使用前须彻底清洗和干燥。

4. 销毁受污染的鞋子。

眼睛接触：1. 立即以大量清水冲洗15分钟以上。

2. 立即就医。

食入：1. 立即与地方毒物中心或医师联络。

2. 若患者已失去意识，不可以催吐或喂食任何流体。

3. 给予大量水或牛奶。

4. 若患者催吐，保持其头部低于臀部以减低吸入危险。

5. 若患者已失去意识，将肉不转至侧边。

6. 立即就医。

|                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>最重要症状及危害效应：呼吸道灼伤、皮肤灼伤、眼睛灼伤、黏膜灼伤。</p> <p>对急救人员之防护：应穿着C级防护装备在安全区实施急救。</p> <p>队医师之提示：患者吸入时，考虑给予氧气。吞食时，避免洗胃及引发呕吐。</p>                                                                                                                                                  |
| <p><b>五、消防措施</b></p>                                                                                                                                                                                                                                                  |
| <p>适用灭火器：适用干粉或沙土，禁止用二氧化碳和酸碱灭火剂灭火。</p>                                                                                                                                                                                                                                 |
| <p>危险特性：遇酸或露置空气中能吸收水分和二氧化碳，分解出剧毒的氰化氢气体。遇高热分解释放出高毒烟气。</p>                                                                                                                                                                                                              |
| <p>特殊灭火程序：1. 安全情况下将容器搬离火场。<br/>2. 以水雾冷却暴露火场的贮槽或容器直到火熄灭。<br/>3. 远离贮槽两端。</p>                                                                                                                                                                                            |
| <p>消防人员之特殊防护设备：佩戴全身式化学防护衣及空气呼吸器（必要时外加抗闪火铝质被覆外套）。</p>                                                                                                                                                                                                                  |
| <p><b>六、泄漏应急处理方法</b></p>                                                                                                                                                                                                                                              |
| <p>个人应注意事项：远离危害区域，并禁止相关人员进入。</p>                                                                                                                                                                                                                                      |
| <p>环境注意事项：-</p>                                                                                                                                                                                                                                                       |
| <p>清理方法：1. 不要碰触外泄物。<br/>2. 在安全许可下设法止泄。<br/>3. 少量泄漏：用沙或其他不燃物质吸附，并将该吸附之物质放置于适当之容器作处置。<br/>4. 小量固体泄漏：小心扫起，转移致安全场所。<br/>5. 大量泄漏：收集回收或运至废物处理场所处置。</p>                                                                                                                      |
| <p>消除方法：用大量的次氯酸钠进行破氰处理。</p>                                                                                                                                                                                                                                           |
| <p><b>七、操作处置与储存方法</b></p>                                                                                                                                                                                                                                             |
| <p>处置：1. 工作地区维持良好的卫生习惯。<br/>2. 处置时需穿戴防护衣物。<br/>3. 使用溶液或浓缩时避免解除到皮肤和眼睛。<br/>4. 作业时禁止饮食、吸烟。<br/>5. 小心操作和开启容器。<br/>6. 勿将未使用完之产品倒回贮桶。<br/>7. 避免容器物理性损坏。<br/>8. 使用后务必用肥皂及水洗手。<br/>9. 工作服分开清洗。</p>                                                                           |
| <p>储存：1. 检查容器是否有清楚的表示和不会溢漏。<br/>2. 保持干燥：地板应覆盖或涂上抗酸性物质。<br/>3. 储存于原容器中。<br/>4. 保持容器密闭。<br/>5. 储存于阴凉、干燥及通风良的区域。<br/>6. 储存室需远离不相容物（硷、金属、强抗氧化剂）和食品器具。<br/>7. 避免容器物理性损坏和定期测漏。</p>                                                                                          |
| <p><b>八、接触控制和个体防护：</b></p>                                                                                                                                                                                                                                            |
| <p>工程控制：提供局部排气的通风系统。</p>                                                                                                                                                                                                                                              |
| <p>控制参数：<br/>八小时日时量平均容许浓度/段时间时量平均容许浓度/最高容许浓度：-/-/-<br/>生物指标：-</p>                                                                                                                                                                                                     |
| <p>个人防护设备：<br/>呼吸防护：1. 若是有经常性的使用或会暴露在高浓度下，需要呼吸防护。<br/>2. 呼吸防护依最小至最大的暴露浓度而有所不同。<br/>3. 在使用前，须确认警告注意事项。<br/>4. 使用全面型含有粉尘和雾滴滤材之呼吸防护具，或是全面型含高效率滤材之空气清净式呼吸防护具，或是含有粉尘、雾滴汗熏烟滤材之动力型空气清净式呼吸防护具或是含紧密面罩和具高效滤材之动力式空气清净式呼吸防护具。<br/>5. 未知浓度或立即危害生命健康的浓度状况下：正压全面型供氧式呼吸防护具，辅以逃生型之</p> |

之正压式呼吸防护具或全面型自摘式呼吸防护具。

手部防护： 化学防护手套。

眼睛防护： 防护安全护目镜、面罩、提供紧急洗眼睛洗装置或是快速淋浴装置等。

皮肤及身体防护： 化学防护衣。

卫生措施： 1. 工作后尽速脱掉污染之衣物，洗净后才可以再穿戴或丢弃，且须告知洗衣人员污染之危险性。  
2. 工作场所严禁抽烟或饮食。  
3. 处理此物后，须彻底洗手。  
4. 维持作业场所的清洁。

## 九、物理及化学性质

|           |                 |
|-----------|-----------------|
| 物质状态：液体   | 形状：液体           |
| 颜色：无色至浅黄色 | 气味：无气味          |
| PH值：3.9   | 沸点/沸点范围：-       |
| 分解温度：/    | 闪火点：-<br>测试方法：- |
| 自燃温度：-    | 爆炸界限：-          |
| 蒸气压：近于0   | 蒸气密度：比空气重       |
| 比重：16Be   | 溶解度：完全混溶        |

注明：上述物理数据为典型值，不应最为规范。

## 十、稳定性及反应性

稳定性：稳定。

禁配物：酸类、强氧化剂、食品添加剂、水、二氧化碳、高热

避免接触的条件：潮湿的空气

分解产物：氰化物、氰化氢、含氮氧化物

## 十一、毒理学资料

急性毒性：LD<sub>50</sub>:6.4mg/kg(大鼠口服)；4300ug/kg（大鼠腹腔）。它可经呼吸道、皮肤或消化道吸收，产生急性症状。经口消化道吸收的致死剂量有很大不同，取决于当时胃中是否有实物存在。

刺激性：对动物眼睛和皮肤的刺激性实验结果为重度刺激。

亚急性和慢性毒性：在室温下主要由于吸入本品粉尘而引中毒。

代谢：游离氰基在体内的主要代谢途径是在硫氰化酶（或β 巯基丙酮酸转硫酶）的催化作用下，与硫加成反应，转变成毒性很低的SCN<sup>-</sup>（只有CN<sup>-</sup>毒性的1/200），然后由尿、唾液、汗液等排出体外。游离氰基还可与体内含钴的化合物如羧钴胺（维生素B<sub>12</sub>）结合形成无氰的氰钴化合物，因此临床上有用羧钴胺或依地酸二钴抢救CN<sup>-</sup>急性中毒的报告。  
人体对CN<sup>-</sup>有较强的解毒机能，氰化物是非蓄积性毒物，当不致产生中毒剂量的少量外源性氰根进入机体后，可被迅速转化为无毒或低毒物质排出体外。

慢性中毒：慢性中毒系小量长期接触所致，或反复多次地发生轻度的急性中毒，从而引起人体的一些反应，主要表现有：头痛、头昏、失眠、记忆力及注意力减退、食欲不振、恶心腹痛、便秘、尿频、心前区压迫感、血压低心悸、呼吸困难，全身肌肉酸痛或刺痛、病情发展则精神萎靡，智力减退，甲状腺增大、感性功能减退、皮肤接触可产生斑疹、丘疹和疱疹。

致畸性：引起胚胎毒性。肌肉、骨骼发育异常及心血管（循环）系统发育异常。

## 十二、生态学信息：

生态毒性：1、高等动物的HCN急性中毒症状有共同之处，即最初呼吸兴奋，经过麻痹，横转侧卧，昏迷不醒 痉挛，窒息，呼吸麻痹，最后致死。对狗、猫、猴则是现有规律性的呕吐。

2、非生物降解性：自然界对氰化物的污染有很强的净化作用，因此，一般来说外源氰不易在环境和机体中积累。只有在特定条件下（事故排放、高浓度持续污染），氰的污染量超过环境的净化能力时，才能在环境中残留、蓄积，从而构成对人和生物的潜在危害。

3、生物降解性：水中微生物可破坏低浓度的氰化物，使其成为无毒的简单物质，但要消耗掉水中部分溶解氧，这就是含氰废水所以能用活性污泥处理的基本原理，但若氰离子浓度较高，则会对细菌产生毒害作用，从而影响废水的生化处理过程。据研究，氰化物浓度大于1mg/L时将影响活性污泥的处理能力。通过生物滤池的含氰废水，其浓度亦不应大于2mg/L。

|                                                                                                                                                           |                                            |       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-------|
| 氰化物在水中的存在将降低水中的溶解氧，使生物氧量降低，消化作用降低还会产生一系列的水质问题。                                                                                                            |                                            |       |
| 4、迁移转化和降解：氰化物广泛的存在于自然界中。动植物体内都含有有一些氰类物质，它水解后释放出游离的氰化氢，在一些普通粮食、蔬菜中也可检出微量氰。                                                                                 |                                            |       |
| 5、土壤中也普遍含有氰化物，并随土壤深度的增加而递减，其含量为0.003-0.13mg/kg。天然土壤中的氰化物主要来自土壤腐植质。腐植质是一类复杂的有机化合物，其核心由多元酚聚合而成，并含有一定数量的氮化合物。在土壤微生物作用下，氮化合物可以生成氰和酚，因此土壤中氰的本底含量与其中有机质的含量密切相关。 |                                            |       |
| 6、多数氰化物易溶于水，因此排入自然环境中的氰化物易备水（或大气）淋溶稀释、扩散，迁移能力强。                                                                                                           |                                            |       |
| 十三、废弃处置方法                                                                                                                                                 |                                            |       |
| 废弃处置方法：1.参考相关法规处理。                                                                                                                                        |                                            |       |
| 2.其废包装盒要经过严格的冲洗回收，并无害化处理后才能废弃。无使用价值的化学品经回收后，用大量的次氯酸钠破氰处理后废弃。                                                                                              |                                            |       |
| 废弃注意事项：处理者必需佩戴齐全好劳动防护用品，废弃物尽量转交给有处理资质的厂家进行处理。                                                                                                             |                                            |       |
| 十四、运送资料                                                                                                                                                   |                                            |       |
| 联合国编号（UN No）:UN1588                                                                                                                                       |                                            |       |
| 联合国运输名称：氰化亚金钾                                                                                                                                             |                                            |       |
| 运输危害分类：第1类                                                                                                                                                |                                            |       |
| 包装类别：Ⅰ类包装                                                                                                                                                 |                                            |       |
| 海运污染物（是/否）：否                                                                                                                                              |                                            |       |
| 特殊运送方法及注意事项：运输前应先检查包装容器是否完整，运输过程中要确保容器不泄露、不倒塌、不坠落、不损坏，避免与二氧化碳接触。严禁与酸类、强氧化剂、食品添加剂、水混运。运输时运输车辆应配备泄露应急处理设备。运输途中应防雨淋、防高热。公路运输时要按规定路线行驶，勿在居民区和人口稠密区停留。         |                                            |       |
| 十五、法规资料                                                                                                                                                   |                                            |       |
| 适用法规：1.《危险化学品安全管理条例》，（2011年12月1日实施）                                                                                                                       |                                            |       |
| 2.《危险化学品名录》（2002年版）                                                                                                                                       |                                            |       |
| 3.《有毒作业分级》《使用有毒物质作业场所劳动保护条例》                                                                                                                              |                                            |       |
| 4.《剧毒化学品目录》（2002年版）《国家危险废物名录》                                                                                                                             |                                            |       |
| 5.《工作场所有害因素职业接触限值》等                                                                                                                                       |                                            |       |
| 十六、其他资料                                                                                                                                                   |                                            |       |
| 参考文献                                                                                                                                                      | 制造商或供应商名称：永艺发金属制品(深圳)有限公司                  |       |
| 制表单位                                                                                                                                                      | 地址：深圳宝安区松岗镇江边第三工业区创业三路14号11栋2C             |       |
|                                                                                                                                                           | 紧急联络电话：0755-33181901 /传真电话0755-81734903    |       |
| 制表人                                                                                                                                                       | 职称：化验主管                                    | 姓名：覃勇 |
| 制表日期                                                                                                                                                      | 2017年1月5日                                  |       |
| 有效日期                                                                                                                                                      | 二年                                         |       |
| 备注                                                                                                                                                        | 1、述资料中符号[—]代表目前查无相关资料，而符号[/]代表此栏位对该物质并不适用。 |       |
|                                                                                                                                                           | 2、本公司只应客户的要求而提供此资料，但不为此保重或承担任何法律责任。        |       |
|                                                                                                                                                           |                                            |       |

# 物質安全資料表(MSDS)

## 一、物质厂商资料

|                                           |                      |
|-------------------------------------------|----------------------|
| 名稱：连续镀镍                                   | 產品編號：BL-2015-1-11-01 |
| 制造商或供应商名称：永艺发金属制品（深圳）有限公司                 |                      |
| 制造商或供应商地址：深圳市宝安区松岗镇江边工业区创业三路 14 号 12 栋 1A |                      |
| 制造商或供应商电话：0755-33181901                   | 傳真：0755-33181903     |

## 二、物质成份名称资料(原材料、药水名称)

| 原材料名称 | 镀液含量% |
|-------|-------|
| 氨基磺酸镍 | 10%   |
| 氯化镍   | 0.8%  |
| 硼酸    | 3.5%  |
| 添加剂   | 0.3%  |

## 三、危害辨别资料：

|                                                                                  |                      |
|----------------------------------------------------------------------------------|----------------------|
| 最重                                                                               | 健康危害效应：无相关数据         |
| 要危                                                                               | 环境影响：十二项生态资料内容       |
| 害與                                                                               | 物理性及化学性危害：十六项安全性及反应性 |
| 效应                                                                               | 特殊危害：无相关资料           |
| 主要症状：无相关资料                                                                       |                      |
| 物質危害:本产品在生产过程中,由于都是化学品,操作不当,会引起皮肤发痒\腐烂\红肿\恶心,对于人体吸入,会造成刺激性伤害,需戴防护用具,电镀成品后不具有危险性. |                      |

## 四、急救措施：

不同暴露途径之急救方法：

吸入：一将患者立即撤离现场,移至通风良好的地方休息,给氧呼吸.

皮膚接觸：脫下被污染的衣服，立即用大量水清洗接觸部位，如有發炎應就醫。

眼睛接觸：立即用大量水清洗眼睛達 15 分鐘，並立即就醫。

食入：飲用大量水或食鹽水，並催吐就醫

最重要症狀及危害效应：一

對急救人員之為防護：一

對醫師之提示：一

## 五、防火措施

適用防火劑：1、水霧

2、噴水

3、二氧化碳

4、化學乾粉

滅火時可能遭受之特殊危害：—不可燃物不适用.

特殊滅火程序：—不可燃物不适用

消防人員之特殊防護裝設：穿戴自攜式呼吸器及防護衣

## 六、洩漏處理方式：

個人應注意事項：防護手套, 轻拿轻放/

環境注意事項：不能將濃度高的液體排入河川

清理方式：使用木屑、砂土吸附，然後以水沖洗

## 七、安全處置與儲存方式

處置：穿戴安全眼鏡，防護手套

儲存：避免陽光直接照射或接觸高溫物及強氧化物，保存期限一年

## 八、暴露預防措施

工程參數：—无相关数据

控制參數：—无相关数据

個人防護設備：防護手套

呼吸防護：設製排氣裝置

手部防護：防護手套

眼睛防護：—

皮膚及身體防護：衣物

衛生措施：1、工作場所嚴禁飲食及抽煙

2、維持作業場所清潔

## 九、物理及化學性質

物質狀態：固體

顏色：銀白色

酸鹼度：—

分解溫度：—

自然溫度：—

蒸氣壓：—

密度：—

狀態：依产品形状—

氣味：无

沸點/沸點範圍：

閃火點：—

測試方法：V 開杯 閉杯

爆炸界限：—

蒸氣密度：—

溶解度：—

## 十、安全性及反應性

安全性：安全，無聚合危險性  
特殊狀況下可能之危害反應：－  
應避免之：不通气通风.  
應避免之物質：不可與氧化性物質，有機過氧化物放置同一場所  
危害分解性：無

十一、毒性資料

急毒性：無  
局部效應或皮膚腐蝕性：無  
致敏感性或刺激性：無  
慢毒性或長期毒性：强酸碱对皮肤, 肌肉有腐蚀危害性.

十二、生態資料

可能之生態影響/環境流佈：水中生物分解度低, 会对环境造成影响.

十三、廢棄處置方法

廢棄處置方法：依據當地環保法規處理

十四、運送資料

国内/國際運送規定：无相关数据  
特殊運送方法及注意事項：应注意会有滑落, 掉落之危险发生, 不可直接接触.

十五、法規資料

適用法規：劳动法中, 工作环境, 空气安全标准要求.

十六、其他資料

|      |                 |      |                    |
|------|-----------------|------|--------------------|
| 制表单位 | 永艺发金属制品（深圳）有限公司 | 地址   | 深圳市宝安区松岗镇江边工业区创业三路 |
| 制表日期 | 2015-1-5        | 有效日期 | 一年                 |
| 审 核  | 譚伙庆             | 制表人  | 谢玉梅                |

## 5. 材质证明书

### 材 质 证 明 书

深圳市沃尔核材股份有限公司 H 无卤环保热缩套管 是一种环保型热收缩套管，组成材料为聚烯烃加适量阻燃剂和助剂。产品中铅（Pb）、镉（Cd）、汞（Hg）、六价铬（Cr<sup>6+</sup>）、多溴联苯（PBBS）、多溴联苯醚（PBDES）等环境物质含量符合日本 SONY-SS-00259 和欧盟 RoHS 2002/95/EC 指令环保要求。

其主要成份如下：

| 原料名称  |                     |                                                 | 使用<br>目的 | 含量  | 供应商  | CAS NO.   |
|-------|---------------------|-------------------------------------------------|----------|-----|------|-----------|
| 中文    | 英文                  | 分子式                                             |          |     |      |           |
| 聚烯烃   | Polyolefin          | (CH <sub>2</sub> CH <sub>2</sub> ) <sub>n</sub> | 主 剂      | 50% | 北京有机 | 9002-88-4 |
| 氢氧化镁  | Magnesium Hydroxide | Mg(OH) <sub>2</sub>                             | 阻燃剂      | 35% | 锦昊辉  | 1309-42-8 |
| 磷系阻燃剂 | Phosphorus          | (NH <sub>4</sub> PO <sub>3</sub> ) <sub>n</sub> | 阻燃剂      | 10% | 上海海以 | 7723-14-0 |
| 色母粒   | Pigment             | 色 粉                                             | 着色剂      | 5%  | 华万彩  | ——        |
| 油 墨   | Printing Ink        | ——                                              | 印 字      | ——  | 新东方  | ——        |

## 6. 技术资料

- (1) ISO9001 证书
- (2) ISO14001 证书
- (3) ISO/TS16949 证书
- (4) SGS/ITS/CTI 检测报告

深圳市沃尔核材股份有限公司

2011 年 05 月 09 日

深圳市沃尔核材股份有限公司

物 质 安 全 资 料 表  
MATERIAL SAFETY DATA SHEET

一、化学品名称和制造商信息 Chemical Product & Company Information :

|                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 物品名称：无卤无红磷环保热缩套管<br>Article: Halogen Free and Red Phosphorus Free Flame-retardant Heat Shrinkable Tube.                                                         |
| 规格型号：全系列规格<br>Spec: All Spec.                                                                                                                                   |
| 制造商或供货商名称：深圳市沃尔核材股份有限公司<br>Manufacture or supplier: ShenZhen Woer Heat—Shrinkable Material Co.,Ltd.                                                             |
| 地址及电话：深圳市坪山新区兰景北路沃尔工业园/深圳市南山区西丽新围沃尔大厦<br>Address: WOER BULIDING XINWEI INDUSTRY PARK XILI TOWN SHENZHEN CITY CHINA<br>TEL: 86-755-28299167 FAX: 86-755-28299164 |

二、化学组成信息 Composition/Information on Ingredients :

| 原料名称 |                        |                                                 | 使用目的 | 含量  | 供应商  | CAS. NO.   |
|------|------------------------|-------------------------------------------------|------|-----|------|------------|
| 中文   | 英文                     | 分子式                                             |      |     |      |            |
| 聚烯烃  | Polyethylene           | (CH <sub>2</sub> CH <sub>2</sub> ) <sub>n</sub> | 主剂   | 50% | 北京有机 | 9002-88-4  |
| 氢氧化镁 | Magnesium Hydroxide    | Mg(OH) <sub>2</sub>                             | 阻燃剂  | 5%  | 进口   | 1309-42-8  |
| 聚磷酸铵 | Ammonium Polyphosphate | (NH <sub>4</sub> PO <sub>3</sub> ) <sub>n</sub> | 阻燃剂  | 42% | 进口   | 68333-79-9 |
| 色母粒  | Pigment                | 色母+填充剂                                          | 着色剂  | 3%  | 华万彩  | ——         |
| 油墨   | Ink                    | ——                                              | 印字   | ——  | 上海捷信 | ——         |

三、危害信息 Hazards Identification :

|                                   |                                                                                                                                                                                |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 最重要的危害项目<br>KEY<br>HAZARD<br>ITEM | 健康危害效应：点燃后在短时间内会熄灭，有少量烟雾产生，对人体呼吸道产生轻微伤害。Health hazard note: Be fired for a moment and will be flameout, it will produce a little smoke, the smoke will hazard breath a little. |
|                                   | 环境影响：危害空气。<br>Environment hazard note: If be fired and pollute the air.                                                                                                        |
|                                   | 物理性及化学性危害：常态是管状，在70-125℃预热收缩。<br>Physics and chemistry characteristic: it normal is pipe and will shrink at 70-125℃, that perhaps is harmful.                                  |
|                                   | 特殊危害：如果火烤、烟熏，烟雾会冲击眼睛、呼吸系统，对人体产生伤害。<br>Specific hazard: if be fired or sootiness, it will produce smoke and hurt eyes breath.                                                   |

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主要症状：眼睛流泪，喷嚏，咳嗽，在呼吸新鲜空气会减轻相应症状。

Mostly symptom: lachrymation , sneeze ,cough. It will be good after breathing fresh air.

物品燃烧危险：点燃时会短时间燃烧。

Fireproofing characteristic: It flames out for a moment after leaving fire.

### 四、急救措施 First Aid Measures :

不同暴露途径之急救方法：First-aid measures:

吸入：在正常操作下没有吸入的危险。

Normal it is not harmful for breath.

皮肤接触：正常接触时对皮肤无损伤。由于此管易划伤，建议操作时戴手套。

Skin touch: Normal it is not harmful for skin

眼睛接触：无影响 Normal it is not harmful for eyes.

食入：不能食用。 It can' t be eaten..

最重要及危害效应：吸入燃烧烟雾，冲击呼吸系统。

Key symptom: Be fired ,the smoke choke the breath.

对急救人员之防护：配戴呼吸防护装置。 First aid defend: Get on gas mask

对医师之提示：对呼吸系统严重症者，应不断吸入新鲜空气来减轻症状。

Doctor suggest: If breath a lot of smoke ,must breath more fresh air , it can help you to reduce the symptom.

### 五、消防措施 Fire Fighting Measures:

适用灭火剂：不能长时间燃烧，使用粉末灭火器。

Fire-fighting material medical: Dust farina powder .

灭火时可能遭遇之特殊危害：燃烧可产生少量烟雾，冲击人体呼吸系统。

During fire-fighting, special hazard: Be fired ,produce a little smoke , and it can choke the breath.

特殊灭火程序：无。

Special fire-fighting program: No special program.

消防人员之特殊防护设备：正常消防设备。

Fire-fighter special dependence: Normal fire-fighting device.

### 六、泄露应急处理 Accidental Release Measures :

个人应注意事项：无 Person notice: No

环境注意事项：无 Environment notice: No

清理方法：无 Cleaning method: No special method

### 七、操作和储存 Handling and Storage:

操作：用烘箱和热风枪加热即可收缩。

Handling: Using oven or heating gun and it will shrink.

储存：常温下用纸箱包装好放置在凉荫处。

Deposit: At normal temperature paper box package, no sun straight shine.

### 八、接触控制和个人防护措施 Exposure Controls/Personal Protection:

接触控制：无危害 Exposure Controls: No danger.

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个人防护措施：无 Dependence: No

## 九：理化特性 Physical and Chemical Properties：

| 性能   | 测试方法                          | 性能指标              |
|------|-------------------------------|-------------------|
| 物理性能 | 拉伸强度/MPa                      | GB/T1040          |
|      | 断裂伸长率/%                       | GB/T1040          |
|      | 热老化后拉伸强度/MPa                  | UL224; 158℃×168hr |
|      | 热老化后断裂伸长率/%                   | UL224; 158℃×168hr |
|      | 耐热冲击                          | UL224; 250℃×4hr   |
|      | 抗冷弯曲                          | UL224; -30℃×1hr   |
|      | 耐电压                           | UL224             |
|      | 击穿强度/KV/mm                    | GB/T1408          |
|      | 体积电阻率/ $\Omega\cdot\text{cm}$ | GB/T1410          |
| 化学性能 | 铜安定性                          | UL224; 158℃×168hr |
|      | 抗腐蚀性                          | UL224; 158℃×168hr |
|      | 阻燃性                           | UL224             |

## 十、稳定性和反应活性 Stability and Reactivity：

|                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 稳定性：不能分解。Stability: No decompose                                                                                                                           |
| 特殊状况下可能之危害反应：有火的话，此种产品会短时间燃烧，产生烟雾。<br>Special condition, perhaps hazard: If has fire, the production can be fired for a moment and produce a little smoke. |
| 应避免之状况：高温放置会收缩。<br>Please avoid the condition: At heat temperature condition the production will shrink.                                                   |
| 应避免之物质：火种 Please avoid the condition: Fire.                                                                                                                |
| 危害分解物：烟雾。Hazard decompose material: Smoke.                                                                                                                 |

## 十一、毒理学信息 Toxicological Information:

|                                              |
|----------------------------------------------|
| 急毒性：无 Rapid virulence: No                    |
| 局部效应：无 Part effect: No                       |
| 致敏感性：无 Cause hypersusceptibility : No        |
| 慢毒性或长期毒性：无 Slowly or long-term virulence: No |
| 特殊效应：无 Special effect: No                    |

## 十二、生态学信息 Ecological Information:

|                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 可能之环境影响/环境流：该产品不会在自然界分解，对动植物及水生物不会产生危害。Perhaps environment effect: The production can't decompose at nature condition, so it can't hazard the animal and plant. |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 十三、废弃处置 Disposal Considerations:

## 深圳市沃尔核材股份有限公司

废弃处置方法：这些物品将统一收集给废品收购站，作相应环保处理。

Trash disposal: Collect and treat for the environment.

### 十四、运输信息 Transport Information:

国际运送规定：无 World wild transportation rule: No

联合国编号：无 U.N. code: No

国内运送规定：无 Transportation in china rule: No

特殊运送方法及注意事项：避免挤压变形，利器损伤。

Special transportation method and notice: Avoid extrusion distortion, edge tool hurt.

### 十五、法规信息 Regulatory Information:

适用法规：UL224 Comply rule or law: UL224

### 十六、其他信息 Other Information:

参考文献：CTI/ITS/SGS检测报告 Reference : CTI/ITS/SGS Test Report

製表單位名稱：深圳市沃尔核材股份有限公司

地址：深圳市坪山新区兰景北路沃尔工业园 電話：0755-28299167

製表人：范松林 Prerson who Prepared the MSDS: Songlin Fan

製表日期：2012年1月15日 Date the MSDS Was prepared: Jan 15 2012

備註：无

(以上内容如有歧义以中文为准 If the Chinese and English content are different, the Chinese content is right)



## NOTICE OF AUTHORIZATION TO APPLY THE UL MARK

07/27/2012

Shenzhen Woer Heat-shrinkable Material Co Ltd  
Mr. YORWAY SHORE  
Xinwei Industrial Park, Woer Mansion  
Nanshan District, Xili  
Shenzhen Guangdong 518052, Cn

Our Reference: File E203950, Vol. 2, New Section 6      Project Number 11SC04650  
Your Reference: YORWAY SHORE  
Project Scope: UR/c-UR. Component – Extruded Insulating Tubing: Evaluation of new flexible heat shrinkable irradiation-cross-linked polyolefin tubing Cat. No. RSFR-HPF, rated 125°C, 600 V, VW-1 flame, All color except Clear

Dear Mr. YORWAY SHORE:

UL's investigation of your product(s) has been completed under the above Reference Number and the product was determined to comply with the applicable requirements.

This letter temporarily supplements the UL Follow-Up Services Procedure and serves as authorization to apply the UL Mark only at authorized factories under UL's Follow-Up Service Program.

To provide the manufacturer with the intended authorization to use the UL Mark, the addressee must send a copy of this notice to each manufacturing location currently authorized in File E203950, Vol. 2, New Section 6.

This authorization is effective from the date of this Notice and only for products at the indicated manufacturing locations. Records in the Follow-Up Services Procedure covering the product are now being prepared and will be sent in the near future. Until then, this letter authorizes application of the UL Mark for 90 days from the date of this letter.

Products that bear the UL Mark shall be identical to those that were evaluated by UL and found to comply with UL's requirements. If changes in construction are discovered, appropriate action will be taken for products not in conformance with UL's requirements and continued use of the UL Mark may be withdrawn. UL may elect to withdraw use of the UL Mark if the Applicant or Manufacturer fails to comply with UL's requirements including ongoing compliance of the product, under UL's Follow-Up Service.

Any information and documentation provided to you involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

The contents of this Letter are intended solely for the use of UL and the Applicant. The opinions and findings of UL represent its judgment given with due consideration to the necessary limitations of practical operation in accordance with UL's objectives and purposes. UL shall not otherwise be responsible for the use of or reliance upon the contents of this letter by anyone. UL shall not incur any obligation or liability for any loss, expense or damages, including incidental, consequential or punitive damages, arising out of or in connection with the use or reliance upon the contents of this letter to anyone other than the Applicant as provided in the agreement between UL and Applicant. Any use or reference to UL's name or certification mark(s) by anyone other than the Applicant in accordance with the agreement is prohibited without the express written approval of UL.

Very truly yours,

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