

## **General Terms and Conditions of Sale and Delivery for Products and Services of AT&S Korea Co. Ltd.**

### **1. Scope of Application**

- 1.1 Unless otherwise expressly agreed AT&S Korea Co. Ltd. (hereinafter referred to as "AT&S") General Terms and Conditions of Sale and Delivery as amended from time to time, which are provided to the contracting party of AT&S (hereinafter referred to as the "Contracting Party") on the homepage of AT&S, shall exclusively apply to delivery of goods and, *mutatis mutandis*, to provision of services by AT&S and its agents<sup>1</sup>. These General Terms and Conditions of Sale and Delivery of AT&S shall be in each case an integral part of the corresponding contract. They shall also apply to all future contractual relationships with a Contracting Party.
- 1.2 General terms and conditions of the Contracting Party shall not become part of a contract, even if they are not expressly objected to by AT&S. By placing an order, accepting an order from AT&S or concluding a contract with AT&S the Contracting Party waives application of its own general terms and conditions, in particular of the clause providing for exclusive application of the same.
- 1.3 Deviations from these General Terms and Conditions of Sale and Delivery shall only be effective if confirmed and/or acknowledged by AT&S in writing. Agreements to change this formal requirement must be made in writing.

### **2. Offers**

- 2.1 Offers made by AT&S shall be subject to change until conclusion of contract and shall be valid for a maximum of 3 (three) months. Costs estimates of AT&S shall be non-binding and shall not oblige AT&S to execute an order for the rendering of services that were stated in a cost estimate.
- 2.2 No documents relating to offers or projects must be copied or made accessible to third parties without the consent of AT&S. AT&S may, at any time, ask that they be returned, and they shall be returned to AT&S without delay if the order is placed with someone else.

### **3. Conclusion of Contract**

- 3.1 The contract shall be deemed concluded once AT&S, upon receipt of the order, has issued a written acknowledgement of order or has dispatched a shipment.  
References and links to general terms and conditions or specific requirements of the Contracting Party, which are quoted on orders, shall be considered as not accepted and such terms and conditions or specific requirements shall not become part of the contract, even if they are not expressly objected to by AT&S. Those links or documents shall only be effective if confirmed and/or acknowledged by AT&S in writing.  
Also customer specifications of the Contracting Party shall only be valid if confirmed and/or acknowledged by AT&S in writing. Any customer specifications of the Contracting Party which are not confirmed and/or acknowledged shall not be applicable.
- 3.2 Any information contained in catalogues, brochures or other documents of AT&S as well as any other written or oral statements shall only be relevant if they are expressly referred to in the acknowledgement of order.
- 3.3 Subsequent modifications of or amendments to the contract shall be acknowledged in writing in order to be valid.

### **4. Prices**

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<sup>1</sup> Translator's note: Agents, i.e. persons employed by AT&S Korea Co. Ltd. in performance of its obligations.

- 4.1 Prices apply exclusive of VAT and other taxes, if any; which shall always be payable in the statutory amount. Cash discounts, discounts, credit notes for goods, etc. granted shall be calculated on the basis of selling prices exclusive of VAT and other taxes.
- 4.2 The prices shall be ex works or ex warehouse of AT&S, inclusive of AT&S standard packaging and exclusive of VAT and other taxes. If fees, taxes or other charges are levied in connection with the delivery, they shall be borne by the Contracting Party. If delivery including shipment has been agreed, the cost of shipment as well as the cost of the transport insurance requested by Customer, if any, shall be charged separately but shall not include unloading and distribution. Packaging shall only be taken back if this was explicitly agreed. Packaging and packing aids must only be re-used by the Contracting Party if the logo and the name of AT&S as well as the trademark and other marks of AT&S have been made unrecognizable.
- 4.3 If the order deviates from the overall offer, AT&S reserves the right to change the price accordingly.
- 4.4 The prices are based on the costs applicable at the time of the first price offer made by AT&S. If costs increase by the time of delivery, AT&S shall be entitled to adjust the prices accordingly.
- 4.5 If the prices given by AT&S are stated in a foreign currency, they are based on the middle rate of the date the acknowledgement of order is issued. In case of changes in exchange rates of more than 2% (two percent) to the detriment of AT&S, AT&S shall be entitled to adjust the prices accordingly. In that case the Contracting Party shall be entitled to rescind the contract in writing within seven days with respect to the quantities not then delivered.
- 4.6 In case of repair orders AT&S shall render the services it considers expedient and charge such services on the basis of the expenses incurred. This shall also apply to services and additional services which only turn out to be expedient in the course of execution of the order. In that case no special notification to the Contracting Party shall be required.
- 4.7 The expenses of drawing up repair offers or of inspections shall be invoiced to the Contracting Party.
- 5. Delivery**
- 5.1 The delivery period shall commence as of the latest of the following points in time:
- (a) date of acknowledgement of order
  - (b) date at which all technical, commercial and other prerequisites for which the Contracting Party is responsible have been fulfilled
  - (c) date at which AT&S receives a down-payment or security to be made or provided prior to delivery of the goods.
- 5.2 Official permits or permits from third parties that may be required for execution of plants shall be obtained by the Contracting Party. If such permits are not granted on time, the delivery period shall be extended accordingly.
- 5.3 AT&S shall be entitled to make and invoice partial or advance deliveries.
- 5.4 If delivery on call has been agreed, AT&S may consider the goods to have been called 3 (three) months after the order has been placed and require the Contracting Party to fulfil the obligation to be performed in that case.
- 5.5 If unforeseeable events or circumstances occur that are beyond the will of the parties, such as, e.g., all events of force majeure as defined in clause 12, and which prevent observance of the agreed delivery period, the same shall in any case be extended by the time such circumstances prevailed.
- 5.6 If it was agreed that the goods are to be called by the Contracting Party within a certain period of time, AT&S shall be entitled, in case Contracting Party fails to do so, to rescind the contract in whole or in part without

granting a grace period. In any event AT&S shall be entitled to invoice the costs of storage for the additional time.

- 5.7 The agreed dates of delivery are binding. In case AT&S notices that it cannot meet the agreed delivery date, AT&S has to inform the Contracting Party immediately with giving the estimated duration of the delay. If, upon conclusion of the contract, the parties agreed on a contractual penalty for delay in delivery, such contractual penalty shall be paid according to the following provision; any deviation from this provision shall, however, not affect its applicability to the rest:  
For a delay in performance which was provably caused by AT&S alone the Contracting Party shall be entitled to claim for each full week of such delay a maximum contractual penalty of 0.5% (zero point five percent), but for the total period of the delay a maximum of 5% (five percent) of the value of that part of the overall delivery in question which cannot be used due to delay in delivery of an essential part if the Contracting Party has suffered a loss in such amount.  
Any additional claims based on delay shall be excluded to the extent permitted by law.
- 5.8 In case the Contracting Party notices that it cannot meet the receipt of the delivery at the agreed delivery date, AT&S has to be notified immediately with giving the reasons and the estimated duration of the delay. Subsequent changes of the date of delivery are only valid if confirmed in writing by AT&S. In case the take-over of the goods by the Contracting Party is delayed for more than 1 (one) month, calculated from the agreed date of delivery, AT&S shall in any case be entitled to invoice the goods. The Contracting Party is obliged to compensate AT&S for any direct and indirect damage caused by the delay (e.g. storage costs).
- 5.9 Process interruptions for semi-finished products are only valid if confirmed in writing by AT&S. Such process interruptions might cause additional costs (e.g. abnormal scrap), which shall be reimbursed by the Contracting Party. In case the production of PCBs is blocked for more than a total of 2 (two) months by the Contracting Party, AT&S disclaims any liability and warranty claims caused by delamination. Additionally AT&S disclaims any liability and warranty claims according to clause 8.3. In case of process interruptions for more than a total of 2 (two) months, AT&S shall in any case be entitled to invoice the goods. The Contracting Party is obliged to compensate AT&S for any direct and indirect damage caused by the delay (e.g. storage costs).
- 5.10 In case of buffer stocks maintained by AT&S, the Contracting Party has to pick the stock within 3 (three) months from firm forecast. If Contracting Party fails to pick within 3 (three) months of firm forecast, the AT&S may consider this as sale and invoice the same to the Contracting Party and require the Contracting Party to fulfil his obligations.

## 6. Passing of Risk and Place of Performance

- 6.1 Benefit and risk shall pass to the Contracting Party as of dispatch of the shipment (delivery to carrier) ex works or ex warehouse of AT&S, respectively, and in case of a delay in acceptance of goods by the Contracting Party as of the time AT&S is ready to ship the goods, irrespective of the pricing agreed for such shipment (such as, e.g., charges prepaid, CIF or the like). This shall also apply if delivery is made in connection with an assembly or if transport is carried out or organised and managed by AT&S.
- 6.2 The place of performance for services shall be the place where the service is provided. The risk of a service or of an agreed partial service shall pass to the Contracting Party upon provision of the service.

## 7. Payment

- 7.1 Unless special terms of payment have been agreed in writing, the invoice amount (net price plus VAT) shall be due for payment not later than 30 (thirty) days after the invoice date.
- 7.2 If partial invoices are issued the respective partial payments shall be due upon receipt of the respective invoice. This shall also apply to amounts resulting from subsequent delivery or other agreements which exceed the original contract sum, irrespective of the terms of payment agreed with respect to the main delivery.

- 7.3 Payments shall be made without any deduction in the currency stated in the invoice to the paying agent of AT&S. The date of payment shall be the day of receipt by AT&S or the paying agent of AT&S. Acceptance of cheques or bills of exchange shall in each case only be effected on account of payment. All interest and expenses (as, e.g., charges of direct debiting or discount charges) in connection therewith shall be borne by the Contracting Party. Partial payments of the Contracting Party shall be first credited against ancillary charges and subsequently against the oldest of the existing liabilities.
- 7.4 The Contracting Party shall not be entitled to retain or offset payments against counter-claims on grounds of warranty claims or other claims of whatsoever nature.
- 7.5 Payment shall be deemed effected on the date on which AT&S is able to dispose of the amount.
- 7.6 If the Contracting Party is in delay of an agreed payment or other service to be effected on the basis of this transaction or other transactions, AT&S shall be entitled, without prejudice to its other rights
- (a) to suspend fulfilment of its own obligations until the payment or other service has been obtained and make use of a reasonable extension of the delivery period,
  - (b) to demand immediate payment of all accounts receivable outstanding which are to be paid on the basis of this transaction or other transactions and to charge default interest in the amount of 14% (fourteen percent) per year as of the respective due date plus VAT unless AT&S provides evidence of additional costs,
  - (c) to rescind the contract in case a reasonable grace period is not complied with.

In any case AT&S shall be entitled to charge pre-procedural costs, in particular dunning and collection charges and costs of legal counsel.

- 7.7 Discounts and bonuses granted shall be subject to punctual and full payment.
- 7.8 AT&S retains title to all goods delivered by it until full payment of the amounts invoiced plus interest and costs. For the purpose of securing the purchase price claim of AT&S the Contracting Party hereby assigns to AT&S its claim under a resale of goods to which title is retained even if the goods were processed, redesigned or mixed, and undertakes to include a respective accounting note in its list of outstanding receivables or on its invoices. Upon request the Contracting Party shall inform AT&S about the assigned claim including the debtor and shall make available all information and documents required for collection of the claim by AT&S and notify the third-party debtor of the assignment. In the case of an attachment or other seizure the Contracting Party shall be obliged to indicate that AT&S holds title to the goods and to notify AT&S immediately.

## 8. Warranty and Liability for Defects

- 8.1 Subject to the provisions set forth below and upon compliance with the agreed terms of payment, AT&S shall be obliged to repair any defect impairing functionality which exists at the time of delivery and is the result of an error in the construction, of the material or of workmanship. No warranty claims may be deduced from information contained in catalogues, brochures or other written or oral statements that have not been expressly included in the contract.
- 8.2 Only the Contracting Party shall be entitled to assert claims for defects and such claims shall not be assignable. Claims for defects prescribe 12 (twelve) months commencing of the date on which the risk passes according to clause 6. This period of time shall also apply to claims for compensation of consequential damage, as far as no claim in tort is asserted. The legal provisions concerning suspension and restart of time limits remain unaffected.  
This shall also apply to delivery items or services which are inseparably connected with a building or land.
- 8.3 AT&S shall only warrant for the solderability and resistance of delamination during assembling of printed circuit boards if the Contracting Party proves, upon notification of a defect, that the printed circuit boards were stored and treated in accordance with the conditions contained in Article 15 of these General Terms and

Conditions of Sale and Delivery. The warranty period for the solderability of printed circuit board is determined by the provisions of Article 15 of these General Terms and Conditions of Sale and Delivery.

- 8.4 A warranty claim may only be asserted if
- (a) the Contracting Party immediately, but not later than 1 (one) week upon receipt of the goods at the place of destination, notifies the defects that have occurred in writing and exactly describes the type of defect, and
  - (b) the Contracting Party proves that a defect existed at the time the risk passed (according to clause 6).

Defects which could not be detected despite a careful inspection within the period stated above shall be excluded. Such defects shall be deemed accepted if they are not notified immediately after they are detected in the way described above.

The Contracting Party shall immediately prove that a defect exists, and in particular make available to AT&S, upon the latter's request, the samples of the defective goods as well as documents and/or data in the Contracting Party's possession.

After a defect has been identified by the Contracting Party, any disposal of the goods without the express consent of AT&S shall be inadmissible.

Assertion of a defect shall not release the Contracting Party from its payment obligation.

Return of goods complained about, except for those samples of defective goods and documents required by AT&S, shall not be admissible without the prior written consent of AT&S. No claims or other legal consequences may be deduced by the Contracting Party if AT&S takes delivery of goods. Likewise, an examination of the defect by AT&S shall not result in any claims of the Contracting Party or other legal consequences.

If a defect subject to warranty according to clause 8.1 exists, AT&S shall, at its option, subsequently improve the defective goods or the defective part at the place of performance or have the defective goods or in full or in part returned for subsequent improvement or offer the goods at a reasonably reduced price.

- 8.5 All ancillary costs incurred in connection with remedying defects (such as, e.g., mounting and demounting, transport, disposal and travelling expenses) shall be borne by the Contracting Party. For works carried out in connection with warranty claims on the Contracting Party's premises all necessary supporting staff, lifting gears, scaffolds and small parts shall be provided free of charge. Replaced parts shall become the property of AT&S.
- 8.6 If goods are produced by AT&S on the basis of design specifications, drawings, models or other specifications of the Contracting Party, the liability of AT&S shall only extend to execution as agreed.
- 8.7 Defects resulting from arrangement and assembly not effected by AT&S, insufficient set-up, non-observance of installation requirements and conditions of use, excessive use of parts beyond the performance advised by AT&S, negligent or improper treatment or use of unsuitable operating materials shall be excluded from warranty; this shall also apply to defects attributable to material provided by the Contracting Party. Furthermore, AT&S shall not be liable for damage caused by acts of third parties, atmospheric discharges, excessive voltage or chemical impacts. Warranty shall not apply to replacement of parts which are subject to natural wear and tear.
- 8.8 Warranty shall forfeit immediately if the Contracting Party itself or a third party who has not expressly been authorised by AT&S alters or repairs the delivered items without the written consent of AT&S.
- 8.9 The provisions of clauses 8.1 to 8.8 shall apply *mutatis mutandis* also to responsibility for defects on the basis of other legal grounds.

## 9. Rescission of Contract

- 9.1 Unless a more specific regulation has been provided for, the Contracting Party may rescind the contract on the condition that a delay in delivery is due to gross negligence of AT&S and that a reasonable grace period granted by the Contracting Party has fruitlessly expired. Rescission shall be declared by the Contracting Party by registered letter.
- 9.2 Irrespective of its other rights AT&S shall be entitled to rescind the contract
- (a) if execution of the delivery, or commencement or continuing of the service becomes impossible or is further delayed for reasons for which the Contracting Party is responsible even though a reasonable grace period was granted,
  - (b) if doubts regarding the solvency of the Contracting Party have arisen and the Contracting Party fails to make an advance payment or provide appropriate security prior to delivery upon the request of AT&S, or
  - (c) if, due to the circumstances listed in clause 5.4, the delivery period is, in total, extended by more than half of the delivery period originally agreed but is at least 6 (six) months.
- 9.3 Rescission of contract for the above reasons may also be declared with respect to a part of the delivery or service still outstanding.
- 9.4 If insolvency proceedings are opened over the assets of the Contracting Party or a petition for opening of bankruptcy proceedings is dismissed for lack of sufficient assets, AT&S shall be entitled to rescind the contract without having to grant a grace period.
- 9.5 Without prejudice to claims for damages of AT&S, including pre-procedural costs, services or partial services already provided shall be accounted for and paid according to contract in case of a rescission of contract. This shall also apply to the extent the delivery or service has not yet been taken over by Customer as well as to preparatory work carried out by AT&S. As an alternative AT&S may also demand that items already delivered be returned.
- 9.6 Other legal consequences of rescission shall be excluded.

## 10. Liability

- 10.1 Within the scope of statutory provisions AT&S shall be liable for damage beyond the scope of application of the Product Liability Act only if it can be proven that it acted with wilful intent or gross negligence. In cases of gross negligence liability of AT&S (except for personal injuries) shall be limited in each case to ten times the amount of the net selling price of the printed circuit board. Liability for slight negligence, consequential damages (in particular, expected savings which were not made, lost data, loss caused by a business interruption), pecuniary damage, lost interest and damages on grounds of claims of third parties vis-à-vis the Contracting Party shall be excluded.
- 10.2 Any damages shall be excluded if conditions, if any, for assembly, putting into operation or use (such as conditions contained, e.g., in operating instructions) or of official admission requirements are not complied with.
- 10.3 If contractual penalties have been agreed, any additional claims on grounds of the respective violation shall in any case be excluded.
- 10.4 Compensation claims shall become statute-barred 3 (three) years after discovery of the damage and the damaging party, however, in any case 6 (six) years after the risk has passed according to clause 6.
- 10.5 Claims of recourse, if any, that the Contracting Party or third parties assert against AT&S under product liability pursuant to the Product Liability Act [Produkthaftungsgesetz, PHG] shall be excluded unless the party

claiming recourse proves that the mistake was caused within the sphere of AT&S or at least was caused by gross negligence.

## 11. Assertion of claims

Unless provisions separately stipulated or statutory provisions provide for shorter periods, any and all claims of the Contracting Party shall have to be asserted in court within 3 (three) years of passing of the risk; otherwise such claims shall be forfeited.

## 12. Force Majeure

12.1 Events of force majeure which affect AT&S or any of its suppliers shall entitle AT&S to suspend deliveries for the time of the impairment and a reasonable start-up period, or to rescind the contract in whole or in part according to their consequences. The Contracting Party shall, in such a case, not be entitled to claim damages or subsequent delivery.

If delivery is delayed for more than 6 (six) months due to consequences of force majeure, the Contracting Party shall be entitled to rescind the contract with respect to the part of the delivery affected within 8 (eight) weeks.

12.2 Events of force majeure shall include but not be limited to all kinds of acts of God, such as, e.g., earthquake, lightning, frost, storm, floods; as well as war, laws, official interventions, seizure, transport problems, restrictions on import, export and transit, exchange restrictions on international payments, shortage in raw materials and energy; as well as breakdown of operations, such as, e.g., explosion, fire, strikes, sabotage and any other events which it would only be possible to prevent at disproportionately high costs and with commercially unreasonable means.

## 13. Industrial Property Rights and Copyright

13.1 If goods are produced by AT&S on the basis of design specifications, drawings, models or other specifications of the Contracting Party, the Contracting Party shall indemnify and hold AT&S harmless in case of an infringement, if any, of copyrights, intellectual property rights or other industrial property rights or personal rights.

13.2 Execution documents, such as, e.g., plans, sketches or other technical documents as well as samples, catalogues, brochures, illustrations and the like shall always remain the intellectual property of AT&S and shall be subject to the relevant statutory provisions on reproduction, imitation, competition, etc. Clause 2.2 shall in particular also apply to execution documents.

## 14. Other Provisions

### 14.1 Severability Clause:

If individual provisions of the contract or of these terms and conditions are or become ineffective, invalid and/or unenforceable, the effectiveness, validity and/or enforceability of the remaining provisions shall not be affected. The ineffective provision shall be replaced by an effective, valid or enforceable provision which comes as close as possible to the economic purpose intended.

### 14.2 INCOTERMS:

Unless otherwise stipulated in writing, the Incoterms (published by the International Chamber of Commerce, Paris, 1953) as amended from time to time shall apply to the interpretation of the contract clauses used.

### 14.3 Confidentiality:

The Contracting Party shall maintain secrecy about the fact that a contract has been concluded and in advertising materials or reference lists, shall only refer to its business relationship with AT&S after AT&S has agreed thereto in writing. The contracting parties undertake to treat all commercial and technical details which are not publicly known and of which they obtain knowledge in the course of the business relationship as a trade secret. Suppliers shall be obliged accordingly by the Contracting Party. The Contracting Party shall be

liable for any damage, including intangible damage, caused to AT&S due to non-compliance with the foregoing, at least with a contractual penalty of 10% (ten percent) of the overall order sum for each incidence of non-compliance.

- 14.4 **Data Protection:**  
The Contracting Party shall maintain secrecy about personal data of which it has obtained knowledge. The Contracting Party shall be obliged to protect the data against access by third parties.
- 14.5 **Termination of Contract in case of Continuous Obligations:**  
Unless stipulated otherwise, continuous obligations may be terminated by AT&S by giving 6 (six) months' notice. AT&S may terminate contracts with immediate effect for important reason. This shall include cases of gross or repeated violation of material contractual duties by the Contracting Party or the opening of insolvency proceedings over the assets of the Contracting Party or dismissal of a petition for opening of insolvency proceedings for lack of sufficient assets to cover the costs. In case of a justified rescission the Contracting Party shall bear the cost of returning the goods.
- 14.6 **Non-Assignment:**  
The Contracting Party shall not be entitled to assign its rights and duties or its accounts receivable from AT&S to third parties without the prior written consent of AT&S.
- 14.7 **Prohibition to Offset:**  
The Contracting Party shall not offset its own receivables against receivables of AT&S, except for sums which have been awarded by court and debts which AT&S has expressly recognised in writing.
- 14.8 **Legal Succession:**  
AT&S shall be entitled to transfer its rights and duties under the contract concluded with the Contracting Party to companies in which AT&S holds an interest of more than 25% (twenty-five percent) or to companies which hold an interest in AT&S of more than 25% (twenty-five percent). The Contracting Party shall not be entitled to terminate the contract on the basis of such a transfer.
- 14.9 **Written Form:**  
Any declarations, notifications, etc. addressed to AT&S shall be made in writing and shall bear an original signature in order to have legal effect. Agreements which provide for deviation from such formal requirement shall be made in writing.
- 14.10 **Settlement of Disputes and Applicable Law:**  
Contracts or purchase orders in accordance with these General Terms and Conditions shall be exclusively subject to and construed in accordance with Korean law, excluding the conflict of laws rules of the Convention on the Law Applicable to Contractual Obligations (Rome Convention; BGBl. III 1998/208) and the UN Convention on Contracts for the International Sale of Goods dated 11 April 1980 (BGBl. 1988/96).  
All disputes, controversies or differences which arise between the parties, out of or in relation to or in connection with this contract, or for the breach thereof, shall be finally settled by arbitration in Seoul, Korea, in accordance with Arbitration Rules of the Korean Commercial Arbitration Board and under the Laws of Korea. The award rendered by the arbitrator shall be final and binding upon the parties concerned.
- 14.11 **Applicable product specification:**  
As far as the applicable IPC-Standard for the delivered printed circuit boards is not determined in orders, drawings or other documents, AT&S will manufacture according to the internal specifications ATS 23/x and AT&S Visual Inspection Spec.
- 14.12 **RoHS - Directive 2002/95/EG:**  
Printed wiring boards which are produced by AT&S are compliant to the RoHS Directive 2002/95/EC. The only exemption is a printed wiring board which contains the lead-containing surface HAL. According to the RoHS directive there are some exemptions for applications which allow the usage of lead. Due to AT&S doesn't have the exact knowledge about the applications, the responsibility for RoHS compliance has to be assumed by the requestor and not by AT&S.
- 14.13 **Regulation REACH 1907/2006 (Registration, Evaluation, Authorisation of Chemicals):**



According to the definitions mentioned in article 3 (REACH directive), printed wiring boards are articles without intentional release of substances. Therefore no registration of substances is necessary.

## 15. General storage and processing conditions for single-sided, double-sided, multilayer, flex and rigid-flex PCBs

Materials used for the production of PCBs are „hygroscopic“, which means that they absorb humidity from the air during storage. The absorbed humidity evaporates in an extreme short time during the „Reflow Process“, which under certain circumstances could lead to delamination. For this reason a general drying of the PCBs before the thermal impact of assembly is recommended. This drying is a reversible process.

- a.) **Flex and rigid-flex PCBs (FPC and Rigid-FPC)** tend to more display absorption of humidity than rigid PCBs. Drying is mandatory.  
For flex and rigid-flex PCBs (FPC and Rigid-FPC) it is recommended to temper the PCBs before processing and subsequently to process the PCBs within 6 (six) to 8 (eight) hours. For the interim storage the humidity shall not exceed 50%.
- b.) In case of storage between 6 (six) and 12 (twelve) months between manufacturing date of the PCB and soldering at the customer side, single-sided and double-sided as well as multilayer PCBs must be dried promptly before soldering.
- c.) PCBs from opened packages have to be soldered/processed within 24 (twenty four) hours.

### 15.1 General determinations for the drying:

Procedure	single-sided / double-sided PCBs	Multilayer	Flex / Rigid-flex PCBs
Drying	110 – 120°C 2hours	130 +/- 5°C 3hours *	130 +/- 5°C 3hours
Time between drying and processing	46hours	8hours	6hours
Humidity for interim storage	< 50%	< 50%	< 50%

\* Due to its structure (copper layers and copper areas) Multilayers with more than 10 layers require a longer drying time to remove the residual humidity from the PCB. Detailed conditions must be agreed with AT&S on individual basis.

### 15.2 General determinations for the processing of the different surfaces

Surface refinement	Shelf life	Notes	Refreshing
OSP (org. surface protection)	Under the storage conditions stated herein PCBs with surface OSP can be soldered by Reflow within 6 (six) months calculated from the manufacturing date (Date Code)	Before PCBs with surface OSP are dried the OSP surface has to be removed. After the tempering the surface has to be put on again.	PCBs can be refreshed to increase the shelf life for respectively 6 (six) months (provided the PCB is not older than 6 months). The max. guaranteed shelf life shall be 12 (twelve) months calculated from the manufacturing date (Date Code).
Immersion Silver	Under the storage conditions stated herein PCBs with surface ImAg can be soldered by Reflow within 6 (six) months calculated from the manufacturing date (Date Code) on an Immersion silver thickness of 0.12 $\mu$ - 0.3 $\mu$ measured on a 2.25 mm <sup>2</sup> pad size.	This guarantee only holds true if the PCB's are stored as per IPC 4553 section 3.8. Tarnishing of the immersion silver due to excess heating to remove moisture after expected shelf life recommendations or improper packaging will	PCB's can not be refreshed nor reworked.

Surface refinement	Shelf life	Notes	Refreshing
		result in a decrease in solderability performance.	
Chemical tin	Under the storage conditions stated herein PCBs with surface chemical tin can be soldered by Reflow within 9 (nine) months calculated from the manufacturing date (Date Code). The minimum required tin layer thickness for the processing between 6 (six) and 9 (nine) months is 1,0µm.	PCBs with surface chemical tin have to be refreshed after drying because the thermal impact has a negative effect on the wetting of the surface.	PCBs can be refreshed to increase the shelf life for respectively 3 (three) months. The max. guaranteed shelf life shall be 12 (twelve) months calculated from the manufacturing date (Date Code).
HAL / HAL unleaded, galv. Ni/Au, ENIG (chem. Ni/Au)	Under the storage conditions stated herein PCBs with surface HAL/ HAL lead-free, galv. Ni/Au, ENIG (chem. Ni/Au) can be soldered by Reflow within 12 (twelve) months calculated from the manufacturing date (Date Code).	-	-

### 15.3 Mandatory storage conditions for packaged PCBs

The storage conditions as well as the storage time have influence on the absorption of humidity.

**Temperature: 20 ± 5°C**

**Relative humidity: 40 ± 10 %**

Under the above storage and processing conditions PCBs can be soldered **3x Reflow** (profile: IPC J-STD 020 / clause 5.6). Contrary to IPC J-STD 020 AT&S defines the time between two reflow cycles being **24 (twenty-four) hours maximum**. In the event of higher processing exposure AT&S has to be consulted.

In case the specified storage and processing conditions are not kept, AT&S disclaims any liability and warranty claims according to clause 8.3.