COMPOSITE MACHINING TOOLINGS FOR FABRICATION AND FOR REPAIR

INTRODUCTION & OBJETIVES

No catalogue on the market will propose you the innovative tools designed by GMI AERO to perform the generic mechanical works necessary to **install a repair patch on an advanced carbon structure.**
These tools have been categorized in the Leslie series of our catalogue. They are used worldwide by major manufacturers like ATR, AIRBUS, AIR FORCES, Training Centers and by MROs. These tools result of the expertise of GMI in the repair process.
In order to offer a complete solution to the users, specific comprehensive kits have been designed. The more comprehensive version can be labeled as **Mobile Composite Repair Workshop or a Repair Technician Companion.**

Figure 1: Complete Mobile Repair Workshop

A MOBILE COMPOSITE REPAIR WORKSHOP

With our Mobile Composite Repair Workshop, GMI offers to **Civil and Military Repair Centers** the equipment they absolutely need to conduct all the repair tasks before bonding.
GMI invented a series of tools that allows the realization of all the Generic Repair Works on advanced composite structures. They are the **only tools on the market specific for this type of job**, other standard tools from trade, being inappropriate, because they address mainly the production field. Conceived as tool attachments, they are the innovative parts of the Kit. Together with the innovative tools, the user will find the **complete set of necessary accessories to conduct all the repair steps**: from the paint removal task, to the local manufacturing of a patch.

Figure 2: Some of the innovative surface machining tools

CONSOLE COMPOSITION

To perform all the tasks of the repair, the Complete Mobile Workshop is composed of 5 groups of elements:

1. **Group 1:** A selection of accessories to prepare the repair by paint removal, honeycomb cut, lamination of dry fabrics, cutting and assembly of patches.
2. **Group 2:** Pneumatic machines necessary for the Attachments one router and one sander.
3. **Group 3:** The innovative kit of attachments. This kit comes with the necessary kit of diamond cutters and carbide cutters. These cutters are conceived specially to achieve specific repair machining quality. A first set of templates is added. The pneumatic adapted vacuum cleaner is included.
4. **Group 4:** First hand set of bagging products state of the art.
5. **Group 5: (In option)** A foldable oven for drying the sandwich area after core removal and before core installation or potting. The oven is useful to accelerate the potting curing; in some cases it can be used to heat the adhesive when. The oven temperature cycle is controlled by the ANITA Console. The oven is equipped with a specific heat gun.

Tel: + 33 1 42 82 11 44 - Email: gmi@gmi-aero.com - Web: www.gmi-aero.com

A COMPREHENSIVE KIT FOR ALL SURFACE PREPARATION STEPS

The innovative tools designed by GMI to offer the technician the necessary instruments to face all possible tasks of a composite repair on an advanced carbon structure are gathered in the case. With tools, and complementary other selected accessories the repair phase preparation can be fully conducted. **The Kit will allow preparing fully the repair phases:**

- **a.** Remove the paint on the repair area
- **b.** Prepare the installation of the core and patch
- **c.** Dry the sandwich area after core removal with a foldable oven
- **d.** Rout and Step the skin
- **e.** Handle Wet Lay-Up operations if any, or the Prepreg cuts
- **f.** Manufacture the patch pre-cured or to be co-cured
- **g.** Install the patch and make the vacuum bag (heat blanket not provided).

Figure 4: Compressed Air Machine Tool

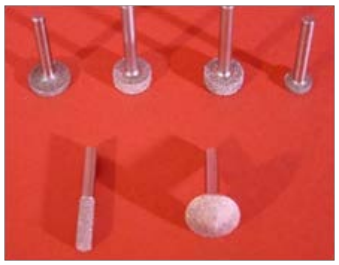

Figure 5: Diamond cones

A SIMPLE A SECURE USE

The use of templates allows the technician to work safely inside the guides, compared to the case of handworks.
The tools use only two pneumatic machines and one set of diamond meshes preselected for the specific work.
The tools are mainly suitable for carbon structure but can be used on fiberglass and kevlar (please consult us for additional information)

The machining are of excellent precision and compatible with the different tolerances of repairs made by a technician.

Figure 3: Illustration of routing, scarfing and stepping operations

MACHINING WORK SCHEMES

The works are categorized to cover the typical schemes met in advanced carbon repair on aircraft structures.

- **a.** Cutting of a carbon laminate doubler, chamfering the edges
- **b.** Routing of a sandwich skin or of a laminate box skin
- **c.** Easy control to remove the skin up to the adhesive or deeper
- **d.** Stepping ply by ply a carbon skin
- **e.** Scarfing with respect of a slope of 3 or 2° a carbon skin.

TO ORDER

A - The **Complete** Mobile Workshop:

Recommended for Airlines, MROs,

P/N: GMIAT87B02-320
Dimensions: 1230 x 535 x 285 mm; Weight: 30 Kg.

B - Restricted version limited to the innovative attachment and tools without accessories. (groups 2, 3, 4, 5 in option)
Recommended for training centers and constructors

P/N: GMICRT9201-WO
Dimensions: 800 x 450 x 300 mm; Weight 23 Kg.

Option for both products: Foldable oven with heat gun and bonder adaptor - P/N GMIET010 + GMIETE011