

User's Manual for Basic Glass Scratch Repair Set

1 This set is easy to use and convenient for users. After receiving this product, please read the user's manual carefully and check out the video files in the U disk. It is suggested to test with waste glasses before starting to repair formally with skills.

2 Since the repair of deep scratches and improper repair of light scratches may make glass deformed, it is suggested to practice frequently, and master repair methods and understand the differences of glass before and after repair before starting repair formally. In addition, it is recommended to communicate with client thoroughly and start repair with client's approval if the scratches to be repaired are on the front windshield glass, especially on the area within the line of sight of driver.

3 In scratch repair process, always see to it that the temperature of glass will rise constantly due to the continuous friction between the grinding sheet, lap disc and glass. The neglect of glass temperature rise may lead to glass breakage (tempered glass is safer relatively). Moreover, water can be added during grinding in order to ensure glass safety to the largest extent.

4 It is normal that the glass will dissipate heat slightly in grinding or polishing process; however, it will be dangerous if glass temperature rises to an extent that is too hot to touch. For this reason, it is important to control glass temperature within a reasonable and safe range (tempered glass is safer relatively, pay extra attention to bullet-proof glass, laminated glass, automobile front windshield and other non-tempered glass), or water can be added for grinding.

5 Water can be added for grinding if necessary (especially for bullet-proof glass, laminated glass, automobile front windshield and non-tempered glass), but in that case, the grinding condition should be observed frequently in order to ensure sufficient grinding, and the next procedure can be entered after grinding is finished. It is not suggested to use #1 grinding sheet for coarse grinding, as coarse grinding marks will be very rough, the cutting performance of #2 and #3 grinding sheets will be weakened if grinding with water, and the grinding track left by 1# grinding sheet cannot be eliminated easily, which may affect the repair effect. #2 grinding sheet can be used for coarse grinding, although the grinding time needed may be longer; the fine grinding and polishing with #3 grinding sheet will be facilitated in that case.

6 Abrasive particles left from the last grinding process may scratch glass in next grinding or polishing process, and the new scratches almost cannot be found in operation process until by

operators after polishing is finished. Therefore, cleaning after each step is very necessary.

7 This set and working area must be kept clean. When not used, grinding sheets and lap discs should be stored properly to avoid dust. Construction environment should also be kept clean during the process since heavy dust will lead to new scratches in repair process.

8 In order to keep the normal use of polishing paste, spray bottle is used in polishing process to provide water discontinuously. At the same time, spray angle should be noticed and water must not be sprayed on the adjustable angle grinder in order to avoid electric shock.

9 In repair process, acceptance methods or quality standards used after finishing repairing should be determined in the first place, since high repair standards and low acceptance standard will waste both time and consumables, while low repair standards and high acceptance standards will make it fail to meet acceptance standards and lead to rework, causing unnecessary loss. Therefore, acceptance standards and quality requirements should be made clear first before repairing. Note: acceptance standards and quality requirements should be executed strictly no matter what acceptance and repair environment it is in (scratches should be repaired under strong light if acceptance inspection will be executed under strong light).

The repair effect will be the best if the following grinding techniques are used,

1 Please adjust the adjustable angle grinder to the lowest shift or shift 1 (speed: 1,000 rpm ~ 1,500 rpm), the speed should not be too high since too high speed will not only affect grinding effect, but also will reduce the service life of grinding sheet due to high temperature and even make grinding sheet and culet scrapped.

2 Do not add water or polishing paste in grinding process; operators should hold the grinding sheet tightly and contact it gently with glass surface, and then apply uniform force gradually and stably to make the grinding sheet reciprocate on glass surface stably. Don't grind with large strength, as large strength will cause the rapid warming of culet and grinding sheet, while excess temperature will scrap the culet and grinding sheet.

3 In grinding process, force should be applied stably and uniformly. It is preferred to grind visible glass powder off.

4 Grinding should be stable and efficient, and reciprocated grinding with 1/2 ~ 2/3 overlapping is preferred.

5 Move the angle grinder to the C.W. direction or other direction regularly to prevent glass

deformation caused by uneven grinding. Do not stop at one point since serious local deformation may be caused.

6 Regular and stable operation of grinding sheet on glass should be ensured as irregular operation will make glass deformed locally, and will also lead to different polishing effects on different parts of the glass.

7 After grinding of the first level is finished, the next level, the grinding range of which should be larger than the grinding range of the previous level by $\frac{1}{3}$ of the area of grinding sheet at the least (the best is to reach the $\frac{1}{2}$ of grinding range), can be started.

8 Grinding marks will be left on glass after the grinding of each level. Large-particle grinding sheet will leave rough grinding marks while small-particle grinding sheet will leave small grinding marks on glass. Moreover, grinding effect can be judged by observing the grinding marks on glass so as to find out if expected grinding effect is met.

9 In many circumstances, the failure to achieve glossy effect is not caused by polishing but poor grinding. We divide grinding into different levels, and the grinding of each level should cover the grinding marks left after previous grinding, with the purpose to replace rough grinding marks to fine marks gradually, so as to facilitate polishing and improve working efficiency.

10 Deformations generated after the repair of deep scratches can be controlled, the following methods can effectively control the deformation after grinding:

Use larger grinding sheets and expand repair range to improve deformation after repair;

Use finer and larger grinding sheet and reduce shear strength in reciprocating grinding to improve deformation after repair effectively;

Use finer and larger grinding sheet, apply smaller strength, and further reduce the shear strength in reciprocating grinding to improve deformation after repair effectively;

In addition, deformation can also be relieved by practicing and mastering the application of this set of products proficiently, operating the products stably, increasing or decreasing grinding distance uniformly and orderly, and avoiding grinding at the same place for certain time or repeatedly.

11 According to scratch position and depth, determine the specification of grinding sheet. 2-in grinding sheet can be selected to repair scratches for which the repair requirement is not high; 3-in grinding sheet can be used to repair scratches for which the repair requirement is high. For high repair effect required, clients should only use fine-particle grinding sheets, or order grinding

sheet of large specification (4-in, 5-in), or finer (#4) grinding sheet from us.

Normal repair steps without water

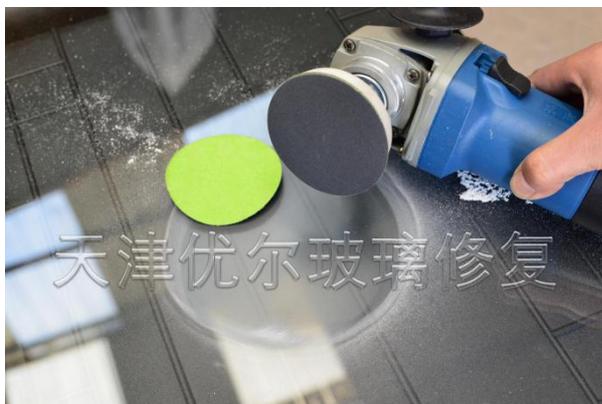
1 Determine the position of scratch. Clean glass surface thoroughly with sufficient amount of water and tissue. It will be preferred if a mark will be made on the back of the glass to be repaired.

2 For deep scratches (such as the scald made by welding slag, etc.), #1 grinding sheet should be used for rough grinding firstly. Stick the cushion between the velour backing surface of sand paper and the grinding polishing tap on the culet and make sure they are matching, and then adjust the adjustable angle grinder to shift 1 and start grinding. Use the grinding sheet to grind glass directly instead of adding water or polishing paste. The grinding sheet should contact with glass horizontally so as to make sure that it totally fits with the glass; uniform grinding force should be applied to ensure steady reciprocating grinding. Do not grind in tilt. Reciprocating grinding should be with 1/2 or 2/3 overlapping. Grinding will generate certain amount of glass powder (wear mask for protection).

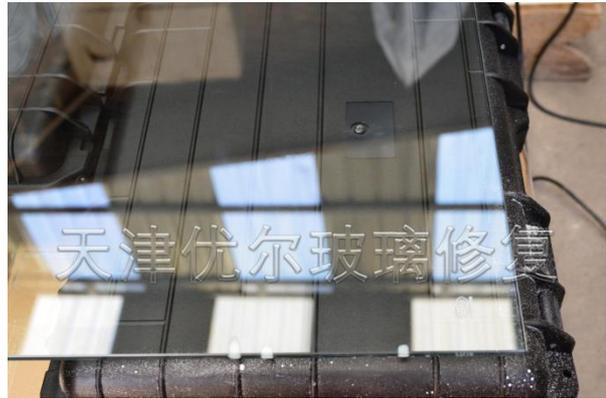


At the same time, attention should be paid to the change of grinding area and glass temperature, and grinding should be stopped if the glass is too hot. Grinding can be continued after the glass is cooled down (temperature control should be paid more attention to when tempered glass is repaired). The function of #1 grinding sheet is to eliminate scratches as soon as possible, and the process can be stopped when all scratches are eliminated. Inspect grinding area carefully after this process is finished to make sure that all scratches have been eliminated.

3 #3 grinding sheet should then be used to grind without water (accurate grinding). Grinding should generate glass powder, and the grinding range should be larger than the marks left after grinding with #1 grinding sheet by half of the grinding sheet at least. Observe grinding marks to make sure that the finer grinding marks made by #3 grinding sheet have replaced all rough grinding marks made by #1 grinding sheet. Pay attention to glass temperature. If glass is too hot, grinding must be stopped, especially when glass that is not tempered is grinded. Grinding can be continued when glass temperature drops to normal temperature.



4 Start polishing. Take the grinding sheet down and replace it with pure wool lap disc or sponge polishing wheel. Squeeze slight amount of polishing paste on the grinding area, and spread it out with the pure wool lap disc or sponge polishing wheel. Then, turn on the switch to start polishing. Spray bottle should be used to provide water while polishing to ensure that the polishing paste is pasty. Observe the state of polishing paste and glass temperature while polishing. If glass temperature is too high, stop polishing immediately. After the glass cools down, continue polishing until the glass become glossy thoroughly. (The use of larger polishing sponge will enhance remediation efficiency.)



5 For common scratches (such as scratches mad by sand), 2# grinding sheet can be used firstly. It should be noted that do not use water or polishing paste and glass powder should be generated while polishing. After scratches are grinded off, use 3# grinding sheet for fine grinding, and then polish the glass. Repair ends after polishing is completed.

6 For fine scratches (such as fine scratches between glass), 3# grinding sheet should be used directly for grinding without adding water or polishing paste. Glass powder should be generated during grinding. Start polishing after scratches are grinded off. Repair ends after polishing is completed.

7 For scratches that can be seen but cannot be felt when touching glasses, they can be polished directly until scratches disappear.

8 Remove all debris left in polishing process and clean the glass. Inspect carefully if there are no scratches or crystals on glass surface and glass is glossy as new.

9 Repair of glass scratches are finished.

Others

1 This set of products is applicable to the grinding without water, i.e. dry grinding, for the special formula of the sand paper. Dry grinding is the most effective and friendly grinding method for users. It is not suggested to add water except in special cases.

2 Judgment of the severity of scratches: the following simple method can be used – the scratches that can be seen easily and felt distinctly by pads of finger can be basically judged as deep scratches; the scratches that cannot be felt with pads of finger easily, but can be felt by fingernail are common scratches; the scratches that can be seen but cannot be felt obviously are slight



scratches; the scratches that cannot be found easily and can be seen in special angle are the slightest crude scratches

3 After the severity of scratch is judged, it is important to determine what repair method should be used. If the serious scratches are repaired with the repair method applicable to slight scratches, it is actually a waste of grinding sheet and time; if slight scratches are repaired with the repair method for serious scratches, the repair time will be lengthened and repair difficulty will be increased, and grinding sheets and consumables will also be wasted.

4 Before repair, repair acceptance standard should be determined. Different repair methods and grinding sheets should be selected according to different acceptance standards: if repair requirement is high, #3 or #2 grinding sheets, or grinding sheets of larger specification should be used. Clients can order #4 or 4-in, 5-in grinding sheets from us. If the requirement is not high, 2-in grinding sheet can be selected for rough grinding and fine grinding; this way, the cost of repair material will be lower. At the same time, the repair time will be made shorter since the repair area is small.

5. Cushion function: prevent the glass from the direct contact with grinding sheet to protect the whole glass, making the grinding process more smoothly, and can prevent leaving trace on the whole glass after grinding finished, making the grinding area look more natural.

6. Disclaimer: We only see to it that this set of products can reach the effect described in this Manual, and will not be liable for the damages, errors, or delivery failure generated in construction and operation process, since different people may understand and operate the products in different manners and their acceptance standards are different!

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