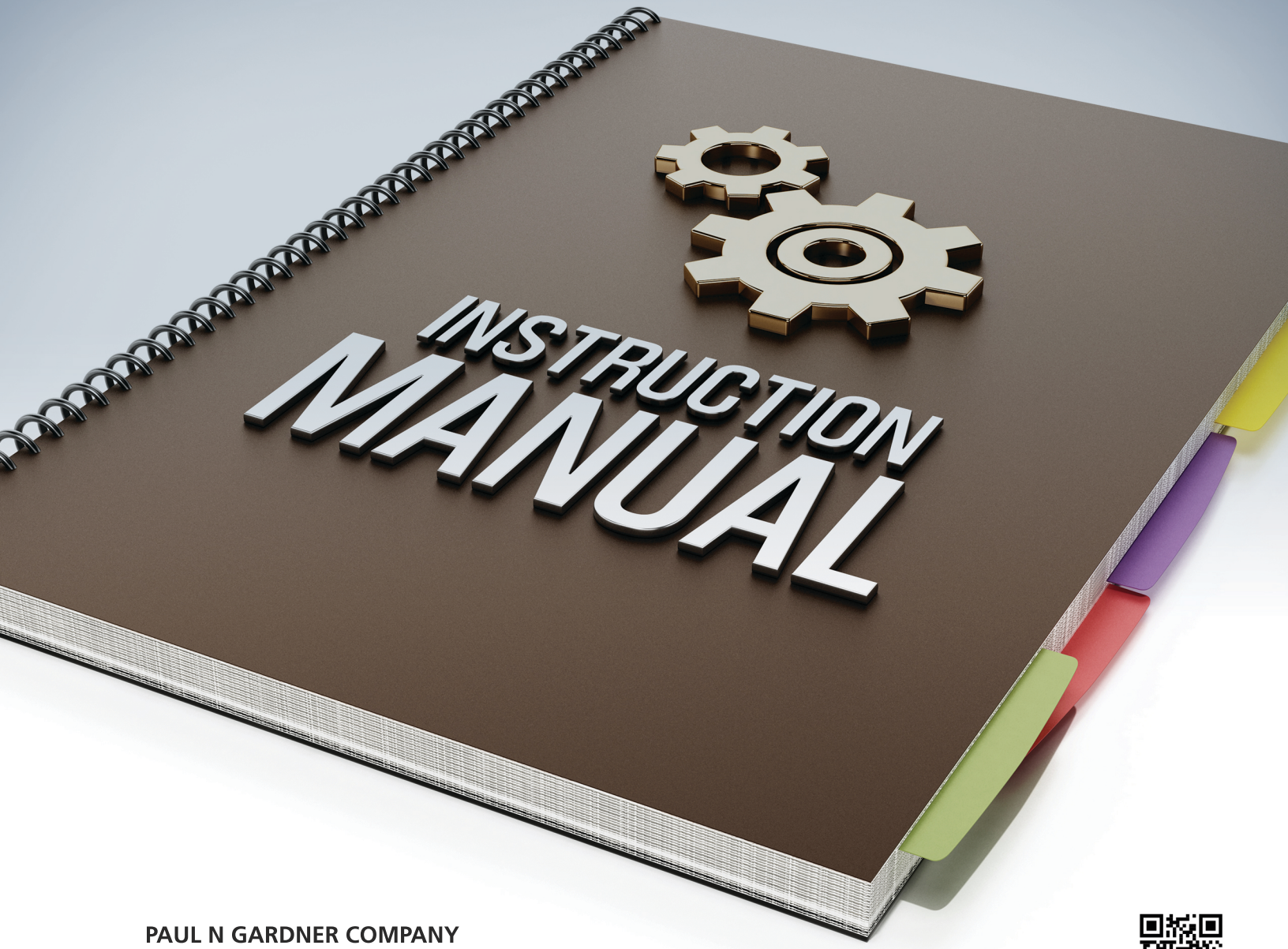

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INSTRUCTIONS

GARDCO DISTRIBUTED PRODUCTS

GARDCO®

TECHNICAL DATA

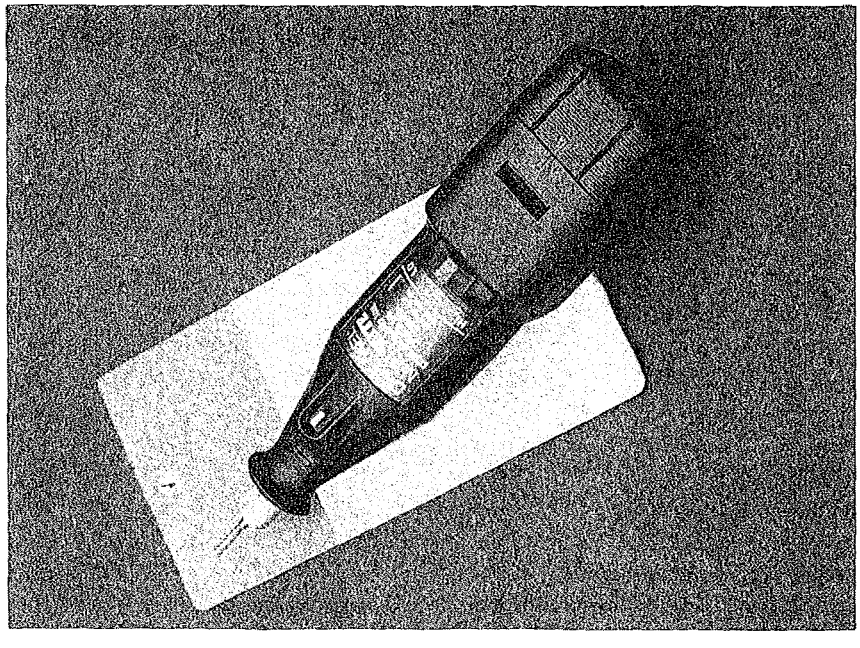
MG402

MG402 MICROGROOVER

MICROGROOVER

Uses

The Microgroover is a major accessory tool for creating coating incisions for film thickness measurements with the Paint Inspection Gage. This tool greatly extends the range of the measuring technique to include almost any coating on any substrate. The Microgroover is especially effective on hard and brittle (concrete) materials, as well as soft or elastomeric (rubber) substances. In addition, fibrous composites are incised easily and cleanly. Aside from film thickness measurements, small-scale operations of cutting, grinding, sawing, and polishing can be performed with this useful cordless power tool.



Description

Principle: The Microgroover is a high-speed rotary tool for creating the small, almost microscopic, incisions required for measurements with the Tooke Paint Inspection Gage. This technique completely eliminates the deformations of coating and substrate which may occur when conventional gage cutting tips are used.

The high-speed cutter, usually with either tungsten carbide or diamond-studded surfaces, "erodes" away surface material in a precise pattern, leaving adjacent and underlying areas totally undisturbed. Hard, brittle, tough, fibrous, tender, or elastomeric materials exhibit clean, non-tearing, controlled disintegration under the rotary cutter.

Grinder Construction: The Grinder unit is the DREMEL MINIMITE Model 750 Cordless Rotary Tool. It comes in a flexible carrycase that can be attached to the Paint Inspection Gage carrycase. It is furnished complete with charger, and with special accessories for grooving operations. The Microgroover adaptation utilizes drill-like grinder tips for groove cutting operations (cylindrical face cutting). The mode of incision is explained in detail below.

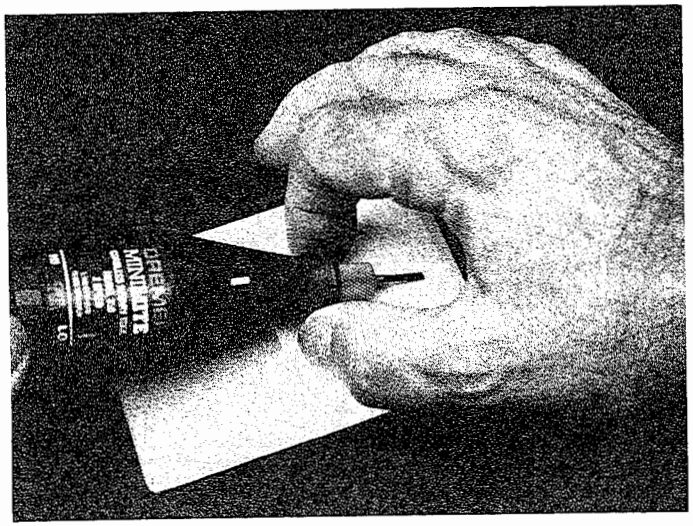


Figure 1. Holding Microgroover for grooving.

Grooving: For precise and rapid measurements, a "drum mode" of cutting was developed. In this mode the grinder is fitted with the No. 9902 tungsten carbide cutter (or equivalent) installed in precise position. With the round rim of the Microgroover in continuous contact with the work surface, the unit is pivoted until the tip contacts the surface, as shown in Figure 1. A light touch with the rotating tip creates the required incision.

Set up, Calibration

Position and tighten the tip securely in place. It should extend from the mouth of the chuck by exactly the long length of the Positioning Block. Usually, no calibration is needed. However, verification may be performed on painted panels previously measured with the Paint Inspection Gage utilizing standard tips. If an adjustment should be needed, loosen the cutter at the chuck and move it inward or outward as required.

Operation

Install the tungsten carbide cutter No. 9902 (or selected cutter) to the position as described above (protruding 1 1/4 inches from the chuck mouth). The battery pack will have been plugged into the charger unit and charged previously in accordance with DREMEL instructions.

Incision is performed by rocking the assembly on the circular plastic rim until the rotating tip makes contact with the work surface. Light contact should suffice, while holding the grinder with sufficient firmness to prevent "walking", as shown in Figure 1.

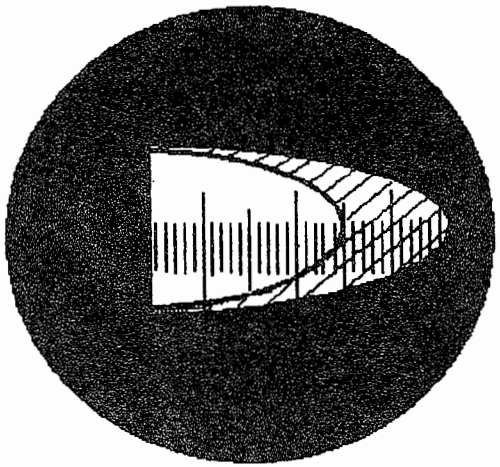


Figure 2. Microscopic drawing of cut

The cutting angles (slopes) of 1X, 2X and 4X are accomplished by using the Positioning Block to elevate the contact shoulder of the Microgroover as required. The required shoulder elevations are as follows:

1X	0.97" (block resting on narrow face)
2X	0.41" (block resting on wide face)
4X	0.00" (block not used)

When the incision is examined with the Paint Inspection Gage microscope, it will appear as a partial cylindrical cavity, with the cavity wall angling gradually upward to the paint surface. Where the wall of the cut penetrates the substrate (metal) surface, the paint film above describes a crescent shape. This crescent shape is the cross-hatched part of the Figure 2. drawing. The correct thickness will be read axially across the thickest portion of this shape. Counting the number of graduations of the microscope reticle within this zone, the correct observed thickness for the 1X, 2X, or 4X position of the grinder will be the count divided by 1, 2, or 4 respectively, or in the example shown, 11/1 = 11, 11/2 = 5.5, or 11/4 = 2.75 mils.

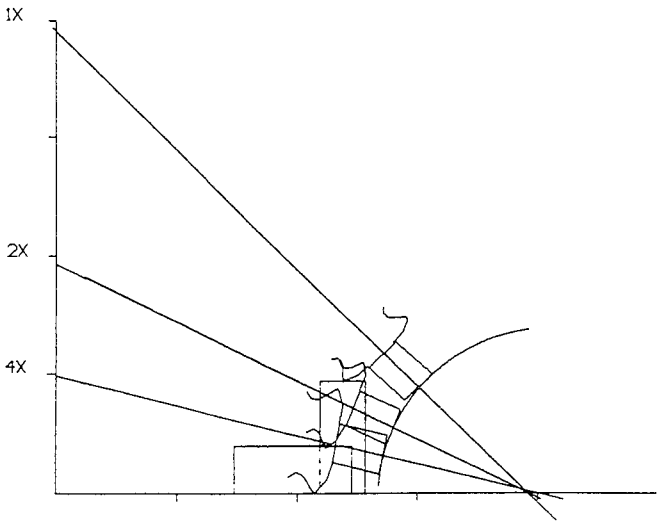


Figure 3. Block positions for various cutting slopes.

Maintenance

Motors, Batteries: The Grinder is powered by rechargeable Ni-Cad batteries in a removeable battery pack. A full charge should suffice for one hundred or more measurements. The charger will completely recharge in three hours.

Cutters: Cutting tip configurations of various types are available, in addition to the items supplied in the kit. Tungsten Carbide Cutter No. 9902 is the standard tip supplied on the Microgroover.

Other Information: Please refer to the enclosed DREMEL Owner's Manual for further instructions and Dremel Limited Warranty.

Specifications

Grinder Unit:	DREMEL 750 MiniMite Cordless Tool
Motor:	4.8 volt DC 5/10 thousand RPM
Carrycase:	Flexible plastic, 2"x2"x8"
Battery Pack:	Plugs into bottom of grinder or charger
Charger:	Plugs into 110 volt AC outlet
Accessories:	Bits and Positioning Block
Shipping Weight:	2 pounds

Ordering Information

MICROGROOVER, MG402, complete with charger, carrycase, cutting tools and special accessories for thickness measurement preparations.

MICRO-METRICS PRODUCTS SUMMARY

PAINT INSPECTION GAGE

A precision tool for inspection and thickness measurement (ASTM D4138) of single or multiple coats on any substrate, and for microscopic observation and measurement of substrate and film defects. Uses illuminated 50-power microscope with measuring reticle, and mounts tungsten carbide cutting tips for precise incision of the work surface. Available in machined aluminum or molded polycarbonate plastic, in rectangular or cylindrical configurations.

MICROGROOVER

A portable high-speed rotary grinder with miniature cutting bits for precisely measurable incisions. Permits the Paint Inspection Gage to be used on coating systems difficult to incise with cutting tips. Greatly improves measurability on concrete coatings, painted drywall, elastomer coatings, and any system of very hard or soft materials.

PENCIL HARDNESS GAGE

Permanently holds all pencil leads in the configuration required to perform ASTM D3363 Pencil Hardness Test, which is the simplest and most generally accepted and understood paint film hardness test.

POCKET IMPACT TESTER

A machinist's automatic centerpunch with calibrated spring loading for standardized triggering force levels. Impact damage observed and measured with the Paint Inspection Gage yields results similar to those from the much more massive laboratory Gardner Impact Tester.

THICKNESS STANDARDS

Supplied in thickness ranges of 1-10 mils and 10-60 mils in either non-certified or certified grades. Packaged in sets of six pieces in a calling-card-sized plastic folder. Essential for performance verification of indirect (magnetic or eddy current) type gages and micrometers, and for precision comparison with Paint Inspection Gage results.

T E C H N I C A L D A T A

MG402-09 CONICAL CARBIDE CUTTER

Uses

This cutter may be used in place of the MG402-02 Cylindrical Carbide Cutter supplied with the MG402 MICROGROOVER. The advantages of the conical cutter are twofold. First, it makes the minimum possible "footprint" on the work surface. Second, it is capable of setting to "X" values well above 4X. Thus it is clearly preferred for use on thin films (< 1 mil) and on curved surfaces.

Description

In more detail, this cutter has a pointed tip with a conical cutting surface having a solid angle of 30 degrees. The material is tungsten carbide. It is used similarly to the cylindrical tip, but with varied protrusions of the cutter in the chuck. These settings are achieved using a small plastic step template for precise length adjustments.

Grooving: This operation is performed as described in MICROGROOVER - TECHNICAL DATA. The shoulder (rim) of the instrument is maintained in continuous contact with the work surface or positioning block while the body is rotated to bring the tip of the cutter into grinding contact with the surface.

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Set up, Calibration

Position and tighten the cutter securely in place. It should extend from the mouth of the chuck by exactly the length of the selected notch of the template. Usually, no calibration is needed. However, verification may be performed on painted panels previously measured with the Paint Inspection Gage utilizing standard tips. If an adjustment should be needed, loosen the cutter at the chuck and move it inward or outward as required.

CUTTER SETUP TABLE

"X" Value	Block Face	Template No.
1X	Edge	2
2X	Edge	3
or	Flat	4
4X	Flat	5
5X	Flat	6
10X	None (omit)	1

Operation

Prepare the surface by applying marking ink to the location to be measured. Incision is performed by rocking the assembly on the circular plastic rim until the rotating tip makes contact with the work surface. Light contact should suffice, while holding the grinder with sufficient firmness to prevent "walking." Wipe the incision lightly with a soft cloth or brush to remove chips and dust.

Measurement

Measurement is virtually identical to that described in the MG402 Technical Data Sheet. In most cases the ellipsoidal cut will be smaller in width than a corresponding cut with the cylindrical cutter. Measurement is made along the long axis of the ellipse where the film displays maximum width.

Specifications

Cutter:	Tungsten Carbide, 1/8" dia. x 1 1/2" length, 30 degree conical tip
Template:	Notched plastic plate, length positions 1,2,3,4,5,6.
Shipping Wt.:	2 oz.

Ordering Information

Conical Cutter, MG402-09, with Setting Template.

T E C H N I C A L D A T A

MG402-M	TIP STABILIZER

Uses

The Tip Stabilizer permits the Microgroover to be held in a fixed location on the painted surface, so that the tool exhibits no tendency to "walk" when a test incision is made. This produces the cleanest incision possible with enhanced precision and accuracy of measurement.

Description

The all-plastic Stabilizer is a one-piece device with a 1.5 inch circular base which rests on the painted surface. A 0.5 inch diameter hole within the base permits the grooving operation to be observed. A rectangular solid boss, slightly off-center, surmounts the disk-shaped base, and provides a convenient shape for holding the Stabilizer firmly. A radial slot 1/16 inch wide extends from the center of the base horizontally and then upward into the middle of the boss at a 45 degree angle with the surface.

Grooving Procedure

Place the Stabilizer on the location to be measured and hold firmly between thumb and forefinger with the heel of the hand also firmly against the paint surface. Insert the Microgroover tip in the slot of the Stabilizer with or without the Positioning Block as required for the desired "X" value. Turn on the Microgroover and generate the incision without excessive grinding. Blow or brush off the surface and observe results Most operators will learn quickly to attain a perfect incision with a single trial.

Ordering Information

Tip Stabilizer MG402-M complete in one piece.

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