



The processing guidelines contained in this document were developed through in-house testing and field experience. However, they should be considered to be starting points that will require further adjustment. Read the following review of processes for applicability to your particular Printed Wiring Board fabrication environment. Remember that the suggestions contained herein can't account for all possible board designs or processing environments. Additional adjustments by the fabricator will be necessary. Isola can and will assist with this process, but the fabricator, not Isola, is ultimately responsible for their process and the end results. **Fabricators should verify that PWB's made using these suggestions meet all applicable quality and performance requirements.**

Part 1: Prepreg Storage and Handling

Isola Group's prepreg bonding sheets for use in multilayer printed circuit board applications are manufactured to specifications that include physical and electrical properties and processing characteristics relative to the laminating application. Handling and storage factors have an important influence on the desired performance of the prepreg. Some parameters are affected by the environment in which prepregs are stored. They can also deteriorate over extended periods of storage. The prepreg received by the customer is a glass fabric that has been impregnated with a stated quantity of low volatile, partially polymerized resin. The resin is tack-free but somewhat brittle. Many lamination problems arise from resin loss off the fabric due to careless handling. The fabric used is based on the order and supplies the required thickness. In most cases the amount of resin carried by the fabric increases as the fabric thickness decreases.

Handling Suggestions:

Handle all prepreg using clean gloves. Use sharp, precision equipment when cutting or paneling prepreg. Treat all prepreg as being very fragile. Use extreme care when handling very high resin content prepreg (glass fabrics 1080 and finer).

Storage Suggestions:

Upon receipt, all prepreg should be immediately moved from the receiving area to a controlled environment. All prepreg should be used as soon as possible. A FIFO (first-in-first-out) inventory management system should be used. If extended storage is required, separate facilities should be reserved with appropriate environmental control.

Prepreg properties will be maintained for six months when stored at 41°F (5°C) and for at least 3 months when stored at 68°F (20°C) and below 50% relative humidity.

Prepreg packages should be allowed to equilibrate to layup room conditions before opening to prevent moisture condensation on the prepreg. Stabilization time will depend on storage temperature. In cases where storage temperature is significantly below room temperature, keep prepreg in package or plastic wrapping during stabilization period to prevent moisture condensation. Storage should be in the absence of catalytic environments such as high radiation levels or intense ultraviolet light.

Prepregs are sold to IPC-4101B specifications. After delivery to the customer, retesting services are available, but passing retest results do not constitute a re-certification. Prepregs will be tested at the original manufacturing site or at another appropriate site to be determined by Technical Service.

Part 2: Innerlayer Preparation

Isola Group's GETEK® laminates are fully cured and ready for processing. It has been the experience of most fabricators that stress relief bake cycles are not effective in reducing any movement of high performance laminates such as GETEK®. Therefore, it is suggested that the movement of unbaked laminate is characterized and the appropriate artwork compensation factors are used.

Dimensional Stability

The net dimensional movement of laminate after the etch, oxide and lamination processes is typically shrinkage. This shrinkage is due to the relaxation of stresses that were induced when the laminate was pressed as well as shrinkage contribution from the resin system. Most of the movement will be observed in the grain direction of the laminate.

Each PCB fabricator should characterize material behavior given their particular lamination cycles, border designs and grain orientation of the laminate to the prepreg.

Imaging & Etching

GETEK® laminates are imaged using standard aqueous dry films and are compatible with both cupric chloride and ammoniacal etchants.

Bond Enhancement

Both reduced oxides and oxide alternative chemistries have been used successfully in fabricating GETEK® multilayer boards to date. Make sure the oxide or oxide replacement coating exhibits a consistent, uniformly dark color.

If reduced oxides are used, consult the chemical supplier for post oxide drying/baking considerations as excessive baking may lead to lower pink ring resistance. It is generally suggested that post-oxide drying be performed vertically, in racks. Suggest mild bake of oxidized innerlayers (15-30 minutes @ 80 – 100 °C) if reduced oxide is used.

For conveyORIZED oxide replacements, an efficient dryer at the end of a conveyORIZED oxide replacement line should remove all moisture from the innerlayer surface. **However, drying of layers for 30 minutes minimum @ 100°C (212°F) or higher is considered a “best practice” . Drying in racks is preferred.**

The use of DSTFoil™ will typically increase the bond strength by approximately 1 to 1.5 lbs as compared to non-DSTFoil copper foil.

If immersion tin adhesion treatments are used, the fabricator should test the coating to verify adequate bond strength is developed with GETEK® prepregs.

Part 3: Lamination

Standard Lamination

The amount of time at cure temperature will be determined by the thickness of the multilayer package being produced. Very thick boards will require a longer cure time to assure optimum material performance. **However, the maximum cure temperature suggestion of 385°F (196°C) should NOT be exceeded.**

Sequential Lamination

Use a 150 minute cure for sub-assemblies depending on thickness and a **180 minute cure** for the final assembly. This suggestion assumes a final assembly thickness ≥ 0.125”.

Removal of GETEK® flash should be performed by routing rather than shearing to minimize crazing along the panel edges.

Table 2 outlines general suggestions for lamination pressure based on press type used.

Table 2 – GETEK® Lamination Pressure

LAMINATION METHOD	SUGGESTED PRESSURE RANGE
Hydraulic Pressing: (without vacuum assist)	325 - 400 PSI (22.9 – 28.1 Kg/cm ²) (22.4 – 26.6 Bar)
Hydraulic Pressing: (with vacuum assist via vacuum frames or bags)	300 - 375 PSI (21.1 – 26.4 Kg/cm ²) (20.7 – 25.9 Bar)
Hydraulic Pressing: (vacuum enclosure)	275 - 350 PSI (19.3 – 24.6 Kg/cm ²) (19.0 – 24.1 Bar)
Autoclave Pressing:	150 - 175 PSI (10.6 – 12.3 Kg/cm ²) (10.3 – 12.1 Bar)



Single-Stage Press Cycle Lamination

The following page outlines the suggested lamination parameters for the Single-Stage lamination cycle. The lamination cycle will be a function of board stackup, complexity and thickness, as well as the lamination press's capability. Note that the attached graph is for reference purposes only and may require adjustment depending on the board size, thickness and complexity. **Thicker boards may require additional dwell time at curing temperature to achieve full cure.** See "Standard Lamination" above.

GETEK® prepreg materials exhibit very low resin flow and "squeeze-out". Therefore, the use of higher pressing pressure is sometimes required for board designs with challenging resin fill requirements. However, also note that the use of extremely high lamination pressure will adversely impact the dimensional stability of core, typically resulting in greater than expected and more inconsistent DS performance. Therefore, choose the lowest pressure setting possible that still ensures sufficient resin movement to properly flow and encapsulate circuitry features.

Further, **choosing a dual stage or "kiss" cycle for GETEK® is typically NOT suggested** due to the low flow nature of the product. If absolutely required, use 25-75 PSI (1.75-5.25 kg/cm²), but apply full pressure before outer (top & bottom) boards in the multilayer press opening reach 220 °F (104 °C). **Consult Technical Service if these types of cycles are to be employed.**

The cycle includes a pressure reduction step, which facilitates stress relief of the package during the cure step. Further, the cycle assumes that vacuum is maintained throughout the heating cycle and that the book is cooled to a temperature well below the T_g of the material before the press is opened. All three conditions are considered to represent "best practice" conditions during lamination by Isola.

However, while use of both the pressure drop cycle and cooling well below T_g in the "hot" press are strongly suggested, they are considered to be "optional" and the PCB fabricator may have equipment or capacity limitations which prevent following these suggestions.

Standard Lamination

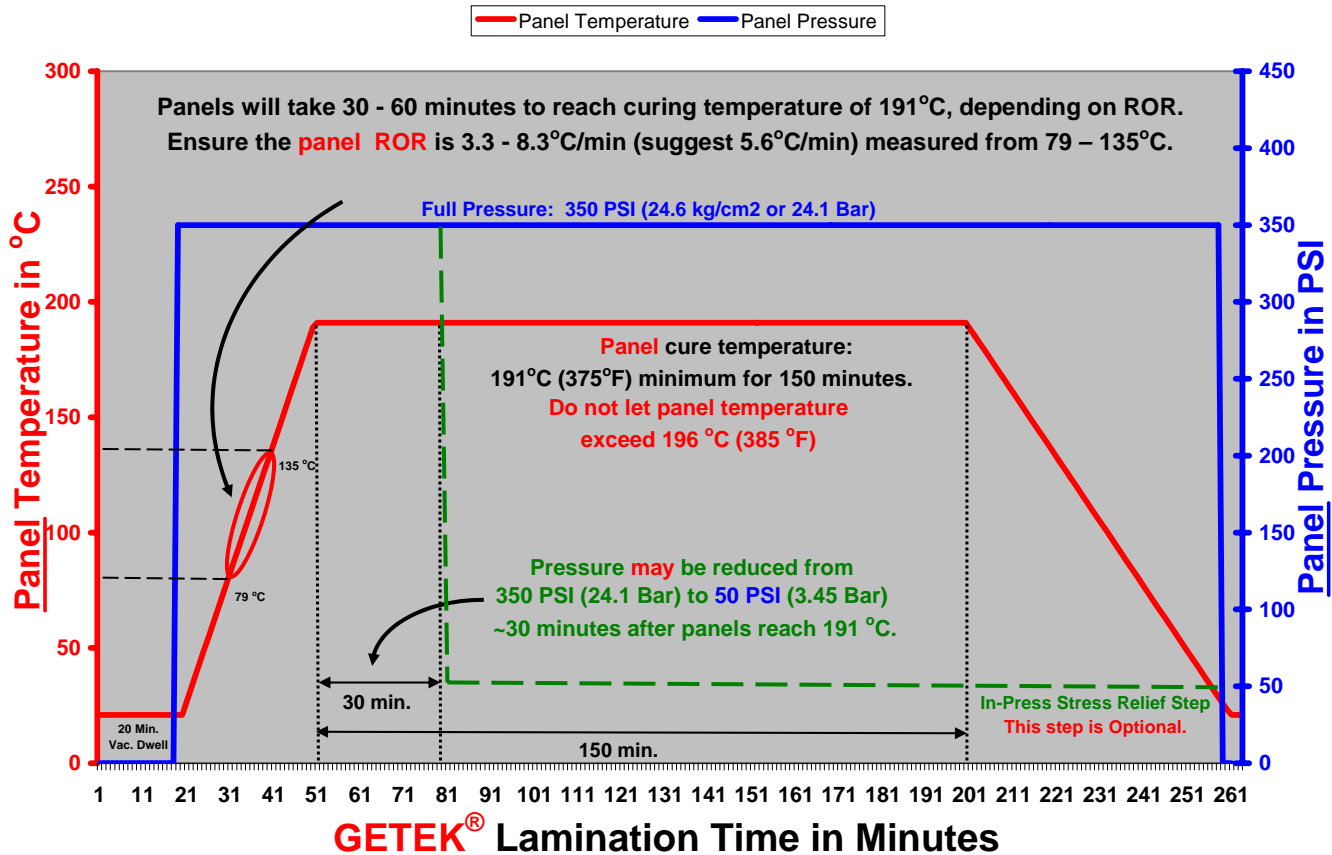
1. Load/center the package as quickly as possible. Pull vacuum for 20 minutes on lifters.
2. Apply pressure of 275-400 psi (19.5–28 kg/cm²) on the panels. **Suggest is 350 psi (24.6 kg/cm² or 24.1 Bar) . Note: The use of a "kiss" cycle is not recommended with GETEK® prepreg.**
3. Adjust heat rise to approximately 6-15 °F/min (3.3-8.3 °C/min), as measured between 175°F - 275°F(79°C - 135°C) by controlling the platen ramp rate and/or by using the right amount of pressure padding. Suggested ROR: 10 °F/Min. (5.6 °C/Min.)
4. **Note:** GETEK® prepregs have **LOW** resin flow characteristics. **Some board designs may require additional adjustments to ROR and/or pressure for better results.**
5. **Cure for a minimum of 150 minutes @ 375 °F (191°C) once the center of package reaches 375°F. Thick panels will require more cure time.**
6. **Do not permit the panels to exceed 385 °F (196 °C).**
7. If possible, reduce pressure to **50** psi (3.5 kg/cm²) after package has been at cure temperature for 30 minutes. This will relieve stress, which will assist subsequent thermal processing.
8. Cool material @ 5°F/min (2.8°C/min) or as slowly as possible down from 375°F (191°C) through 275°F (135°C).
9. Route the flash to minimize crazing along the panel edge.



SUGGESTED GETEK® PRESSURE-TEMPERATURE PROFILE

Please note: This is not a press control program! The graph represents the preferred pressure/temperature profile panels are subjected to during the lamination program cycle. Note that the actual high pressure setting chosen may differ from the 350 PSI suggested setting shown in this graph. Press pressure selected may depend upon board design as well as other factors.

GETEK® PRESS CYCLE



Part 4: Drill

Stack Height and Hit Count

Stack height and hit count will depend on overall board thickness and construction. Thicker boards (greater than 100 mils or) with high layer counts should be drilled one high. **Use only NEW drill bits!** Particularly demanding board designs will have better results if undercut bits are used. Consider using “lubricated backup” or other high-performance backup and/or entry materials to reduce drilling debris in holes. Use “peck” drilling methods for panels > 0.093” (2.4mm) thick. Suggest ~ 0.060” - 0.090” (1.6 – 2.4 mm) per peck.

The tables at the end of this document provide suggested drill parameters that can be used as “starting points”, but these may require additional adjustments. These parameters are for typical multilayer designs.



Part 5: Hole Wall Preparation

General

Good desmear and electroless copper deposition performance are more easily achieved when the drilled hole quality is good. The generation of smooth, debris free hole walls is influenced by the degree of resin cure, drilling conditions and board design considerations. The elimination of 7628 or similar heavy glasses (whenever possible), coupled with properly adjusted drill parameters on fully cured boards has been shown to improve overall drilled hole quality. This helps reduce smear generation, which improves desmear performance and can ultimately help to reduce copper wicking.

Make sure the boards are fully cured and that drilling conditions have been properly adjusted!!

Factors which influence chemical desmear rates, **AND THEREFORE THE SUGGESTIONS IN THIS DOCUMENT**, include: resin type, chemistry type, bath dwell times, bath temperatures, chemical concentrations in each bath and the amount of solution transfer through the holes.

Factors which influence the amount of solution transfer through the holes include: hole size, panel thickness, work bar stroke length, panel separation in the rack and the use of solution agitation, rack vibration and rack “bumping” to remove air bubbles from the holes.

Chemical Desmear

Due to the high T_g and associated chemical resistance of GETEK® material, resin removal rates through permanganate desmear systems tend to be significantly below the resin removal rate of conventional epoxy materials. The ability to successfully use chemical desmear methods is generally a function of board thickness and hole aspect ratio, as well as the general conditions outlined above. Consult the chemical supplier when setting parameters for GETEK® material.

The following section provides general guidelines for the desmear process selection, which are based on board thickness and hole aspect ratio.

Desmear/Etchback With Butyl Carbitol, Glycol Ether or similar swellants, or with NMP-based swellants:

Single pass – for aspect ratios up to 5:1, **and** for board thickness at or below 0.093” (2.36mm)

Double pass—for aspect ratios from 5:1–7:1, **or** for board thickness range of 0.093-0.124” (2.36-3.15mm)

Plasma – for aspect ratios exceeding 7:1, **or** for board thickness greater than 0.125” (≥ 3.18mm)

Plasma Desmear

If available, Plasma can be used with or without a single permanganate pass (to be determined by each fabricator). A mild permanganate pass after plasma processing is suggested.

Plasma processing tends to improve overall hole quality, particularly in thick and/or high aspect ratio boards. Standard plasma gas mixtures and cycles are satisfactory.

3-Point Etchback

True 3-point “Etchback” exposes the innerlayer “post” on all three sides for subsequent plating processes. This will require a more robust approach compared to simple desmear, which is designed only to remove resin smear from the vertical surface of the innerlayer interconnect “posts”. **Keep in mind that processing through permanganate chemistry alone is not suggested to attain a full three-point etchback for GETEK® materials.** If plasma is not available, chemical etchback for 3-point connections must be done with extreme care on GETEK® materials to minimize copper wicking.

Plasma will readily etch back GETEK® resin. Standard plasma gas mixtures and process cycles designed for conventional FR-4 epoxy are satisfactory and are suggested for use as initial starting parameters. The practice of following the plasma process with a chemical process is suggested rather than plasma alone to remove debris and plasma ash residues. Consult the chemical supplier for suggested conditions.



Glass Etching or Frosting

Whenever possible, **glass etches or “frosts” should not be used** because they promote electroless copper wicking along glass fibers on GETEK® materials.

If a double-pass through permanganate desmear is used, a maximum of **one** exposure to the glass etching/frosting chemistry is suggested. **Complete avoidance of glass etching/frosting is preferred.**

Direct Metalization Processes

Direct metalization processes use graphite, carbon black, palladium, conductive polymers, or other methods other than electroless copper deposition to provide a conductive surface in plated through holes. Each direct metalization supplier’s system is unique to at least some extent and process latitude can vary from installation to installation. **Equipment variations can also have an effect on overall process latitude and effectiveness.**

Field experience indicates that the process latitude provided by the combination of “high performance” base materials such as these and direct metalization processes appears to be quite narrow in many instances. The combination of these materials and direct metalization processes should be extensively tested before a fabricator commits to this process. It is strongly suggested that PTH (plated through hole) solderability testing be included as part of any evaluation program.

Periodic evaluation of end product quality will also be necessary to ensure OEM customer expectations are being met on an ongoing basis.

Part 6: Health & Safety

Always handle laminate with care. Laminate edges are typically sharp and can cause cuts and scratches if not handled properly. Handling and machining of prepreg and laminate can create dust (see GETEK® Material Safety Data Sheet).

The data contained in this document, while believed to be accurate and based on both field testing and analytical methods considered to be reliable, is for information purposes only. Any sales of these products will be governed by the terms and conditions of the agreement under which they are sold.

Appropriate ventilation is necessary in machining/punching areas. The use of protective masks is suggested to avoid inhaling dust. Gloves, aprons and/or safety glasses are suggested if individuals have frequent or prolonged skin or eye contact with dust.

Isola Group does not use polybromidebiphenyls or polybromide-biphenyloxides as flame retardants in any product. Material Safety Data Sheets are available upon request.

Part 7: Ordering Information

Contact your local sales representative or:

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Phone: 480-893-6527
Fax: 480-893-1409
For further information visit:
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GETEK® LAMINATE DRILLING GUIDELINES

WHY DRILL SUPPLIERS SHOULD RECOMMEND DRILL PROCESS PARAMETERS

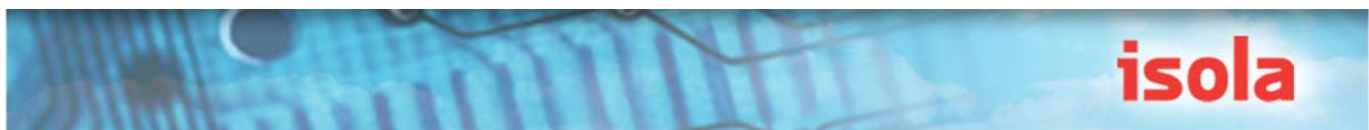
Drilling has become a very complex process with regard to the selection of optimum drill parameters for high performance materials. PCB fabricators must contend with several new factors, in addition to the limitations of the drilling equipment, which affect the quality of the finished product. New drill bit compositions and geometries are foremost among these factors.

The composition changes include new grades of carbide, smaller grain sizes (fine and ultra-fine) and variations in cobalt content (6, 8 and 12%). These changes have a great effect on the hardness, density and flexibility of the drill tool. Newer drill bit geometries include changes in web thickness, web taper, flute length, margin relief, margin drop, margin length and width. These refinements have created a greater selection of drill tools for fabricators who are investigating the use of new materials. These fabricators must focus on quality improvements for smaller diameter, higher aspect ratio drilled holes while also taking economics into account.

Not all drill bit suppliers offer customers equivalent services and most fabricators today have preferred drill bit suppliers as a result. However, most suppliers have experience drilling GETEK® laminates somewhere within their organization and can network to share this information with their other customers. Due to the time and effort (costs) required to develop these processes, some drill suppliers in the past have refrained from sharing this information with material suppliers and utilized this information as a sales tool instead. However, many drill bit suppliers have recently become more open to the idea of sharing this information.

Material suppliers do not have the available resources to keep abreast of the ongoing evolution of drill tool design, let alone the complex interactions that occur between the drill tool and the possible combinations of backup material, entry material, layer count, panel thickness, stack height, tool diameter, aspect ratio, etc. For these reasons, Isola has utilized information from two leading drill bit suppliers that outlines their conclusions regarding the drilling of GETEK® laminates under various conditions. **Three tables are included in this handout: The Megatool table incorporates total material height as a variable, while the Tulon tables focus separately on thin panels (0.062”) and on thick panels (0.255”, 24 layers).** However, since each customer’s drilling environment will be unique, the Suggestions contained in this report should be viewed as appropriate starting points for the customer’s own “designed” experiments (DOE’s). **Further, Isola strongly recommends that new GETEK® laminate customers contact their drill bit supplier and make them an active part of designed experiments to optimize the drilling of this material in the shop.**

Customers who elect to use the attached parameters without performing DOE testing should verify the quality of the drilled holes and make adjustments to these initial Suggestions as required.





A UNION TOOL COMPANY

MEGATOOL INC., 6955 Aragon Circle, Buena Park, California USA 90620-1118
 Phone: (714) 521-6242 - Fax: (714) 521-8642 - http://www.megatool.com

GETEK® Laminate DIAMETERS .0135" (#80) TO .0785" (#47)
 Various number of innerlayers Use ST1, ST2, ST3 or ST4 based upon total Drill Stack Height

**Superior Results Are Frequently Seen With The Combination Of
 The Following Parameters Coupled With Undercut Drill Bit Designs (UCD)**

Dia.	DECIMAL INCH	CUTTING SPEED SFPM	SPINDLE RPM	REC. INFEEED RATE: (MEAN VALUE) IPM INFEEED ~ CHIPLOAD .000" LAMINATE MATERIAL STACK HEIGHT:								Range Values .000" All Stack Heights					
				0 to .062"				.063"--.124"		.125"--.186"		.187"--.248"		MIN		MAX	
				IPM	CL	IPM	CL	IPM	CL	IPM	CL	IPM	CL	IPM	CL		
80	0.0135	353	100,000	80	0.8	89	0.9	99	1.0			68	0.7	110	1.1		
.35mm	0.0138	361	100,000	84	0.8	93	0.9	104	1.0			71	0.7	115	1.2		
79	0.0145	379	100,000	88	0.9	98	1.0	109	1.1			75	0.7	121	1.2		
1/64	0.0156	400	98,000	88	0.9	98	1.0	109	1.1			75	0.8	121	1.2		
.40mm	0.0158	400	97,000	90	0.9	100	1.0	111	1.1			77	0.8	123	1.3		
78	0.0160	400	96,000	90	0.9	100	1.0	111	1.2			77	0.8	123	1.3		
.45mm	0.0177	400	86,000	90	1.0	100	1.2	111	1.3			77	0.9	123	1.4		
77	0.0180	400	85,000	97	1.1	108	1.3	120	1.4			82	1.0	133	1.6		
.50mm	0.0197	400	78,000	97	1.2	108	1.4	120	1.5			82	1.1	133	1.7		
76	0.0200	400	76,000	98	1.3	109	1.4	121	1.6			83	1.1	134	1.8		
75	0.0210	400	73,000	95	1.3	106	1.4	117	1.6	130	1.8	81	1.1	145	2.0		
.55mm	0.0217	400	70,000	93	1.3	103	1.5	115	1.6	128	1.8	79	1.1	142	2.0		
74	0.0225	400	68,000	90	1.3	100	1.5	111	1.6	123	1.8	77	1.1	137	2.0		
.60mm	0.0236	400	65,000	88	1.4	98	1.5	109	1.7	121	1.9	75	1.2	134	2.1		
73	0.0240	400	64,000	88	1.4	98	1.5	109	1.7	121	1.9	75	1.2	134	2.1		
72	0.0250	400	61,000	90	1.5	100	1.6	111	1.8	123	2.0	77	1.3	137	2.2		
.65mm	0.0256	400	60,000	93	1.6	103	1.7	115	1.9	128	2.1	79	1.3	142	2.4		
71	0.0260	400	59,000	94	1.6	104	1.8	116	2.0	129	2.2	80	1.4	143	2.4		
.70mm	0.0276	400	55,000	94	1.7	104	1.9	116	2.1	129	2.3	80	1.5	143	2.6		
70	0.0280	400	55,000	99	1.8	110	2.0	122	2.2	136	2.5	84	1.5	151	2.7		
69	0.0292	400	52,000	99	1.9	110	2.1	122	2.4	136	2.6	84	1.6	151	2.9		
.75mm	0.0295	400	52,000	98	1.9	109	2.1	121	2.3	134	2.6	83	1.6	149	2.9		
68	0.0310	400	49,000	98	2.0	109	2.2	121	2.5	134	2.7	83	1.7	149	3.0		
1/32	0.0312	400	49,000	98	2.0	109	2.2	121	2.5	134	2.7	83	1.7	149	3.0		
.80mm	0.0315	400	49,000	100	2.0	111	2.3	123	2.5	137	2.8	85	1.7	152	3.1		
67	0.0320	400	48,000	102	2.1	113	2.4	126	2.6	140	2.9	87	1.8	155	3.2		
66	0.0330	400	46,000	101	2.2	112	2.4	125	2.7	139	3.0	86	1.9	154	3.3		
.85mm	0.0335	400	46,000	103	2.2	114	2.5	127	2.8	141	3.1	88	1.9	157	3.4		
65	0.0350	400	44,000	100	2.3	111	2.5	123	2.8	137	3.1	85	1.9	152	3.5		
.90mm	0.0354	400	43,000	99	2.3	110	2.6	122	2.8	136	3.2	84	2.0	151	3.5		
64	0.0360	400	42,000	98	2.3	109	2.6	121	2.9	134	3.2	83	2.0	149	3.6		
63	0.0370	400	41,000	98	2.4	109	2.7	121	3.0	134	3.3	83	2.0	149	3.6		
.95mm	0.0374	400	41,000	97	2.4	108	2.6	120	2.9	133	3.2	82	2.0	148	3.6		
62	0.0380	400	40,000	96	2.4	107	2.7	119	3.0	132	3.3	82	2.0	146	3.7		
61	0.0390	400	39,000	95	2.4	106	2.7	117	3.0	130	3.3	81	2.1	145	3.7		
1.00mm	0.0394	400	39,000	95	2.4	106	2.7	117	3.0	130	3.3	81	2.1	145	3.7		





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DIAMETERS .0135" (#80) TO .0785" (#47)

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				0 to .062"				.063"--.124"				MIN		MAX	
				0 to .062"	.063"--.124"	.125"--.186"	.187"--.248"	IPM	CL	IPM	CL				
60	0.0400	400	38,000	93	2.4	103	2.7	115	3.0	128	3.4	79	2.1	142	3.7
59	0.0410	400	37,000	92	2.5	102	2.8	114	3.1	126	3.4	78	2.1	140	3.8
1.05mm	0.0413	400	37,000	93	2.5	103	2.8	115	3.1	128	3.4	79	2.1	142	3.8
58	0.0420	400	36,000	91	2.5	101	2.8	112	3.1	125	3.5	77	2.1	139	3.9
57	0.0430	400	36,000	91	2.5	101	2.8	112	3.1	125	3.5	77	2.1	139	3.9
1.10mm	0.0433	400	35,000	91	2.6	101	2.9	112	3.2	125	3.6	77	2.2	139	4.0
1.15mm	0.0453	400	34,000	90	2.6	100	2.9	111	3.3	123	3.6	77	2.3	137	4.0
56	0.0465	400	33,000	89	2.7	99	3.0	110	3.3	122	3.7	76	2.3	136	4.1
3/64	0.0469	400	33,000	88	2.7	98	3.0	109	3.3	121	3.7	75	2.3	134	4.1
1.20mm	0.0472	400	32,000	87	2.7	97	3.0	107	3.4	119	3.7	74	2.3	133	4.1
1.25mm	0.0492	400	31,000	86	2.8	96	3.1	106	3.4	118	3.8	73	2.4	131	4.2
1.30mm	0.0512	400	30,000	85	2.8	94	3.1	105	3.5	117	3.9	72	2.4	130	4.3
55	0.0520	400	29,000	84	2.9	93	3.2	104	3.6	115	4.0	71	2.5	128	4.4
1.35mm	0.0531	400	29,000	83	2.9	92	3.2	102	3.5	114	3.9	71	2.4	127	4.4
54	0.0550	400	28,000	82	2.9	91	3.3	101	3.6	112	4.0	70	2.5	125	4.5
1.40mm	0.0551	400	28,000	82	2.9	91	3.3	101	3.6	112	4.0	70	2.5	125	4.5
1.45mm	0.0571	400	27,000	80	3.0	89	3.3	99	3.7	110	4.1	68	2.5	122	4.5
1.50mm	0.0591	400	26,000	79	3.0	88	3.4	98	3.8	108	4.2	67	2.6	120	4.6
53	0.0595	400	26,000	78	3.0	87	3.3	96	3.7	107	4.1	66	2.6	119	4.6
1.55mm	0.0610	400	25,000	76	3.0	84	3.4	94	3.8	104	4.2	65	2.6	116	4.6
1/16	0.0625	400	24,000	74	3.1	82	3.4	91	3.8	102	4.2	63	2.6	113	4.7
1.60mm	0.0630	400	24,000	74	3.1	82	3.4	91	3.8	102	4.2	63	2.6	113	4.7
52	0.0635	400	24,000	74	3.1	82	3.4	91	3.8	102	4.2	63	2.6	113	4.7
1.65mm	0.0650	400	24,000	74	3.1	82	3.4	91	3.8	102	4.2	63	2.6	113	4.7
1.70mm	0.0669	400	23,000	71	3.1	79	3.4	88	3.8	97	4.2	60	2.6	108	4.7
51	0.0670	400	23,000	72	3.1	80	3.5	89	3.9	99	4.3	61	2.7	110	4.8
1.75mm	0.0689	400	22,000	69	3.1	77	3.5	85	3.9	95	4.3	59	2.7	105	4.8
50	0.0700	400	22,000	69	3.1	77	3.5	85	3.9	95	4.3	59	2.7	105	4.8
1.80mm	0.0709	400	22,000	69	3.1	77	3.5	85	3.9	95	4.3	59	2.7	105	4.8
1.85mm	0.0728	400	21,000	68	3.2	76	3.6	84	4.0	93	4.4	58	2.8	104	4.9
49	0.0730	400	21,000	68	3.2	76	3.6	84	4.0	93	4.4	58	2.8	104	4.9
1.90mm	0.0748	400	20,000	66	3.3	73	3.7	81	4.1	91	4.5	56	2.8	101	5.0
48	0.0760	400	20,000	66	3.3	73	3.7	81	4.1	91	4.5	56	2.8	101	5.0
1.95mm	0.0768	400	20,000	67	3.4	74	3.7	83	4.1	92	4.6	57	2.8	102	5.1
5/64	0.0781	400	20,000	67	3.4	74	3.7	83	4.1	92	4.6	57	2.8	102	5.1
47	0.0785	400	19,000	65	3.4	72	3.8	80	4.2	89	4.7	55	2.9	99	5.2



MAX RPM	100000
MAX SFM <i>Small</i>	425 (0.0039" - 0.0295")
MAX SFM <i>Large</i>	425 (0.0310" - 0.2770")
MAX CL <i>Small</i>	2.50 mils (0.0039" - 0.0295")
MAX CL <i>Large</i>	2.75 mils (0.0310" - 0.1516")
MAX HIT COUNT	1500
MATERIAL	GETEK® THIN PANELS
CUSTOMER	Baseline Feed & Speed
SERIES	15, 503 & 508



Baseline Feed & Speed

Maximum RPM: 100,000

Material: GETEK® THIN PANELS

Recommended Series: 15, 503, 508

DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.	SUGGESTED OFFSET
0.0039	14	100,000	100	188	102	0.14	-0.004
0.0051	16	100,000	100	188	134	0.16	-0.005
0.0059	17	100,000	100	188	154	0.17	-0.006
0.0063	19	100,000	100	188	165	0.19	-0.006
0.0067	22	100,000	100	188	175	0.22	-0.007
0.0071	26	100,000	100	188	186	0.26	-0.007
0.0075	29	100,000	100	188	196	0.29	-0.008
0.0079	31	100,000	100	188	207	0.31	-0.008
0.0083	36	100,000	100	375	217	0.36	-0.008
0.0087	40	100,000	250	375	228	0.40	-0.009
0.0091	45	100,000	250	375	238	0.45	-0.009
0.0095	50	100,000	250	375	249	0.50	-0.010
0.0098	53	100,000	250	375	257	0.53	-0.010
0.0100	55	100,000	250	563	262	0.55	-0.010
0.0105	61	100,000	250	563	275	0.61	-0.011
0.0110	66	100,000	500	563	288	0.66	-0.011
0.0115	71	100,000	500	750	301	0.71	-0.012
0.0118	73	100,000	500	750	309	0.73	-0.012
0.0120	75	100,000	500	750	314	0.75	-0.012
0.0125	76	100,000	500	750	327	0.76	-0.013
0.0130	79	100,000	1000	750	340	0.79	-0.013
0.0135	81	100,000	1000	1125	353	0.81	-0.014
0.0138	83	100,000	1000	1125	361	0.83	-0.014
0.0145	84	100,000	1000	1125	380	0.84	-0.015
0.0156	91	100,000	1000	1125	408	0.91	-0.016
0.0157	92	100,000	1000	1125	411	0.92	-0.016
0.0160	94	100,000	1000	1125	419	0.94	-0.016
0.0177	88	91,700	1000	1125	425	0.96	-0.018
0.0180	88	90,200	1000	1125	425	0.98	-0.018
0.0197	89	82,400	1000	1500	425	1.08	-0.020
0.0200	89	81,200	1000	1500	425	1.10	-0.020
0.0210	90	77,300	1000	1500	425	1.16	-0.021



MAX RPM	100000
MAX SFM <i>Small</i>	425 (0.0039" - 0.0295")
MAX SFM <i>Large</i>	425 (0.0310" - 0.2770")
MAX CL <i>Small</i>	2.50 mils (0.0039" - 0.0295")
MAX CL <i>Large</i>	2.75 mils (0.0310" - 0.1516")
MAX HIT COUNT	1500
MATERIAL	GETEK® THIN PANELS
CUSTOMER	Baseline Feed & Speed
SERIES	15, 503 & 508



Baseline Feed & Speed

Maximum RPM: 100,000

Material: GETEK® THIN PANELS

Recommended Series: 15, 503, 508

DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.	SUGGESTED OFFSET
0.0217	92	74,800	1000	1500	425	1.23	-0.022
0.0225	92	72,200	1000	1500	425	1.28	-0.023
0.0236	93	68,800	1000	1500	425	1.35	-0.024
0.0240	92	67,600	1000	1500	425	1.37	-0.024
0.0250	94	64,900	1000	1500	425	1.45	-0.025
0.0256	96	63,400	1000	1500	425	1.51	-0.026
0.0260	98	62,400	1000	1500	425	1.58	-0.026
0.0276	101	58,800	1000	1500	425	1.71	-0.028
0.0280	104	58,000	1000	1500	425	1.79	-0.028
0.0292	106	55,600	1000	1500	425	1.90	-0.029
0.0295	107	55,000	1000	1500	425	1.95	-0.030
0.0310	120	52,400	1000	1500	425	2.30	-0.030
0.0312	121	52,000	1000	1500	425	2.32	-0.030
0.0315	122	51,500	1000	1500	425	2.37	-0.030
0.0320	123	50,700	1000	1500	425	2.42	-0.030
0.0330	127	49,200	1000	1500	425	2.57	-0.030
0.0335	127	48,500	1000	1500	425	2.61	-0.030
0.0350	126	46,400	1000	1500	425	2.72	-0.030
0.0354	126	45,900	1000	1500	425	2.75	-0.030
0.0360	124	45,100	1000	1500	425	2.75	-0.030
0.0370	121	43,900	1000	1500	425	2.75	-0.030
0.0374	119	43,400	1000	1500	425	2.75	-0.030
0.0380	117	42,700	1000	1500	425	2.75	-0.030
0.0390	114	41,600	1000	1500	425	2.75	-0.030
0.0394	113	41,200	1000	1500	425	2.75	-0.030
0.0400	112	40,600	1000	1500	425	2.75	-0.030
0.0410	109	39,600	1000	1500	425	2.75	-0.030
0.0413	108	39,300	1000	1500	425	2.75	-0.030
0.0420	106	38,700	1000	1500	426	2.75	-0.030
0.0430	104	37,800	1000	1500	426	2.75	-0.030
0.0433	103	37,500	1000	1500	425	2.75	-0.030
0.0441	101	36,800	1000	1500	425	2.75	-0.030



MAX RPM	100000
MAX SFM <i>Small</i>	425 (0.0039" - 0.0295")
MAX SFM <i>Large</i>	425 (0.0310" - 0.2770")
MAX CL <i>Small</i>	2.50 mils (0.0039" - 0.0295")
MAX CL <i>Large</i>	2.75 mils (0.0310" - 0.1516")
MAX HIT COUNT	1500
MATERIAL	GETEK® THIN PANELS
CUSTOMER	Baseline Feed & Speed
SERIES	15, 503 & 508



Baseline Feed & Speed

Maximum RPM: 100,000

Material: GETEK® THIN PANELS

Recommended Series: 15, 503, 508

DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.	SUGGESTED OFFSET
0.0453	98	35,800	1000	1500	425	2.75	-0.030
0.0465	96	34,900	1000	1500	425	2.75	-0.030
0.0469	95	34,600	1000	1500	425	2.75	-0.030
0.0472	95	34,400	1000	1500	425	2.75	-0.030
0.0492	91	33,000	1000	1125	425	2.75	-0.030
0.0512	87	31,700	1000	1125	425	2.75	-0.030
0.0520	86	31,200	1000	1125	425	2.75	-0.030
0.0531	84	30,600	1000	1125	425	2.75	-0.030
0.0550	81	29,500	1000	1125	425	2.75	-0.030
0.0551	81	29,500	1000	1125	426	2.75	-0.030
0.0571	78	28,400	1000	1125	425	2.75	-0.030
0.0591	76	27,500	1000	1125	425	2.75	-0.030
0.0595	75	27,300	1000	1125	425	2.75	-0.030
0.0610	73	26,600	1000	1125	425	2.75	-0.030
0.0625	72	26,000	1000	1125	425	2.75	-0.030
0.0630	71	25,800	1000	1125	426	2.75	-0.030
0.0635	70	25,600	1000	1125	426	2.75	-0.030
0.0650	69	25,000	1000	1125	425	2.75	-0.030
0.0669	67	24,300	1000	1125	426	2.75	-0.035
0.0670	67	24,200	1000	1125	424	2.75	-0.035
0.0689	65	23,600	1000	1125	426	2.75	-0.035
0.0700	64	23,200	1000	1125	425	2.75	-0.035
0.0709	63	22,900	1000	1125	425	2.75	-0.035
0.0728	61	22,300	1000	750	425	2.75	-0.035
0.0730	61	22,200	1000	750	424	2.75	-0.035
0.0748	60	21,700	1000	750	425	2.75	-0.035
0.0760	59	21,400	1000	750	426	2.75	-0.035
0.0768	58	21,100	1000	750	424	2.75	-0.035
0.0781	57	20,800	1000	750	425	2.75	-0.035
0.0785	57	20,700	1000	750	425	2.75	-0.035
0.0787	57	20,600	1000	750	424	2.75	-0.035
0.0807	55	20,100	1000	750	425	2.75	-0.035



MAX RPM	100000
MAX SFM <i>Small</i>	425 (0.0039" - 0.0295")
MAX SFM <i>Large</i>	425 (0.0310" - 0.2770")
MAX CL <i>Small</i>	2.50 mils (0.0039" - 0.0295")
MAX CL <i>Large</i>	2.75 mils (0.0310" - 0.1516")
MAX HIT COUNT	1500
MATERIAL	GETEK® THIN PANELS
CUSTOMER	Baseline Feed & Speed
SERIES	15, 503 & 508



Baseline Feed & Speed

Maximum RPM: 100,000

Material: GETEK® THIN PANELS

Recommended Series: 15, 503, 508

DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.	SUGGESTED OFFSET
0.0810	55	20,000	1000	750	424	2.75	-0.035
0.0820	55	20,000	1000	750	429	2.75	-0.035
0.0827	55	20,000	1000	750	433	2.75	-0.035
0.0846	55	20,000	1000	750	443	2.75	-0.035
0.0860	55	20,000	1000	750	450	2.75	-0.035
0.0866	55	20,000	1000	750	453	2.75	-0.035
0.0886	55	20,000	1000	750	464	2.75	-0.035
0.0890	55	20,000	1000	750	466	2.75	-0.035
0.0906	55	20,000	1000	563	474	2.75	-0.035
0.0925	55	20,000	1000	563	484	2.75	-0.035
0.0935	55	20,000	1000	563	490	2.75	-0.035
0.0938	55	20,000	1000	563	491	2.75	-0.035
0.0945	55	20,000	1000	563	495	2.75	-0.035
0.0960	55	20,000	1000	563	503	2.75	-0.035
0.0965	55	20,000	1000	563	505	2.75	-0.035
0.0980	55	20,000	1000	563	513	2.75	-0.035
0.0984	55	20,000	1000	563	515	2.75	-0.035
0.0995	55	20,000	1000	563	521	2.75	-0.035
0.1004	55	20,000	1000	563	526	2.75	-0.035
0.1015	55	20,000	1000	563	531	2.75	-0.035
0.1024	55	20,000	1000	563	536	2.75	-0.035
0.1040	55	20,000	1000	563	545	2.75	-0.035
0.1043	55	20,000	1000	563	546	2.75	-0.035
0.1063	55	20,000	1000	563	557	2.75	-0.035
0.1065	55	20,000	1000	563	558	2.75	-0.035
0.1083	55	20,000	1000	563	567	2.75	-0.035
0.1094	55	20,000	1000	563	573	2.75	-0.035
0.1100	55	20,000	1000	563	576	2.75	-0.035
0.1102	55	20,000	1000	563	577	2.75	-0.035
0.1110	55	20,000	1000	563	581	2.75	-0.035
0.1122	55	20,000	1000	563	587	2.75	-0.035
0.1130	55	20,000	1000	563	592	2.75	-0.035



MAX RPM	100000
MAX SFM <i>Small</i>	425 (0.0039" - 0.0295")
MAX SFM <i>Large</i>	425 (0.0310" - 0.2770")
MAX CL <i>Small</i>	2.50 mils (0.0039" - 0.0295")
MAX CL <i>Large</i>	2.75 mils (0.0310" - 0.1516")
MAX HIT COUNT	1500
MATERIAL	GETEK® THIN PANELS
CUSTOMER	Baseline Feed & Speed
SERIES	15, 503 & 508



Baseline Feed & Speed

Maximum RPM: 100,000

Material: GETEK® THIN PANELS

Recommended Series: 15, 503, 508

DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.	SUGGESTED OFFSET
0.1142	55	20,000	1000	563	598	2.75	-0.035
0.1160	55	20,000	1000	563	607	2.75	-0.035
0.1161	55	20,000	1000	563	608	2.75	-0.035
0.1181	55	20,000	1000	563	618	2.75	-0.035
0.1200	47	20,000	1000	563	628	2.36	-0.035
0.1220	47	20,000	1000	563	639	2.36	-0.035
0.1240	47	20,000	1000	563	649	2.36	-0.035
0.1250	47	20,000	1000	563	654	2.36	-0.035
0.1260	47	20,000	1000	375	660	2.36	-0.035
0.1280	47	20,000	1000	375	670	2.36	-0.035
0.1285	47	20,000	1000	375	673	2.36	-0.035
0.1299	47	20,000	1000	375	680	2.36	-0.035
0.1319	47	20,000	1000	375	691	2.36	-0.035
0.1339	47	20,000	1000	375	701	2.36	-0.035
0.1358	31	20,000	1000	375	711	1.57	-0.035
0.1360	31	20,000	1000	375	712	1.57	-0.035
0.1378	31	20,000	1000	375	722	1.57	-0.035
0.1398	31	20,000	1000	375	732	1.57	-0.035
0.1405	31	20,000	1000	375	736	1.57	-0.035
0.1406	31	20,000	1000	375	736	1.57	-0.035
0.1417	31	20,000	1000	375	742	1.57	-0.035
0.1437	31	20,000	1000	375	752	1.57	-0.035
0.1440	31	20,000	1000	375	754	1.57	-0.035
0.1457	31	20,000	1000	375	763	1.57	-0.035
0.1470	31	20,000	1000	375	770	1.57	-0.035
0.1476	31	20,000	1000	375	773	1.57	-0.035
0.1495	31	20,000	1000	375	783	1.57	-0.035
0.1496	31	20,000	1000	375	783	1.57	-0.035
0.1516	31	20,000	1000	375	794	1.57	-0.035
0.1520	30	20,000	1000	375	796	1.50	-0.035
0.1535	30	20,000	1000	188	804	1.50	-0.035
0.1540	30	20,000	1000	188	806	1.50	-0.035



MAX RPM	100000
MAX SFM Small	425 (0.0039" - 0.0295")
MAX SFM Large	425 (0.0310" - 0.2770")
MAX CL Small	2.50 mils (0.0039" - 0.0295")
MAX CL Large	2.75 mils (0.0310" - 0.1516")
MAX HIT COUNT	1500
MATERIAL	GETEK® THIN PANELS
CUSTOMER	Baseline Feed & Speed
SERIES	15, 503 & 508



Baseline Feed & Speed

Maximum RPM: 100,000

Material: GETEK® THIN PANELS

Recommended Series: 15, 503, 508

							SUGGESTED
DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.	OFFSET
0.1555	30	20,000	1000	188	814	1.50	-0.035
0.1562	30	20,000	1000	188	818	1.50	-0.035
0.1570	30	20,000	1000	188	822	1.50	-0.035
0.1575	30	20,000	1000	188	825	1.50	-0.035
0.1590	30	20,000	1000	188	833	1.50	-0.035
0.1594	30	20,000	1000	188	835	1.50	-0.035
0.1610	30	20,000	1000	188	843	1.50	-0.035
0.1614	30	20,000	1000	188	845	1.50	-0.035
0.1634	30	20,000	1000	188	856	1.50	-0.035
0.1654	30	20,000	1000	188	866	1.50	-0.035
0.1660	30	20,000	1000	188	869	1.50	-0.035
0.1673	30	20,000	1000	188	876	1.50	-0.035
0.1693	30	20,000	1000	188	886	1.50	-0.035
0.1695	30	20,000	1000	188	887	1.50	-0.035
0.1713	30	20,000	1000	188	897	1.50	-0.035
0.1719	30	20,000	1000	188	900	1.50	-0.035
0.1730	30	20,000	1000	188	906	1.50	-0.035
0.1732	30	20,000	1000	188	907	1.50	-0.035
0.1752	30	20,000	1000	188	917	1.50	-0.035
0.1770	30	20,000	1000	188	927	1.50	-0.035
0.1772	30	20,000	1000	188	928	1.50	-0.035
0.1791	30	20,000	1000	188	938	1.50	-0.035
0.1800	30	20,000	1000	188	942	1.50	-0.035
0.1811	30	20,000	1000	188	948	1.50	-0.035
0.1820	30	20,000	1000	188	953	1.50	-0.035
0.1831	30	20,000	1000	188	959	1.50	-0.035
0.1850	30	20,000	1000	188	969	1.50	-0.035
0.1870	30	20,000	1000	188	979	1.50	-0.035
0.1875	30	20,000	1000	188	982	1.50	-0.035
0.1890	30	20,000	1000	188	990	1.50	-0.035
0.1909	30	20,000	1000	188	1,000	1.50	-0.035
0.1910	30	20,000	1000	188	1,000	1.50	-0.035



MAX RPM	100000
MAX SFM <i>Small</i>	425 (0.0039" - 0.0295")
MAX SFM <i>Large</i>	425 (0.0310" - 0.2770")
MAX CL <i>Small</i>	2.50 mils (0.0039" - 0.0295")
MAX CL <i>Large</i>	2.75 mils (0.0310" - 0.1516")
MAX HIT COUNT	1500
MATERIAL	GETEK® THIN PANELS
CUSTOMER	Baseline Feed & Speed
SERIES	15, 503 & 508



Baseline Feed & Speed

Maximum RPM: 100,000

Material: GETEK® THIN PANELS

Recommended Series: 15, 503, 508

								SUGGESTED
DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.		OFFSET
0.1929	30	20,000	1000	188	1,010	1.50		-0.035
0.1935	30	20,000	1000	188	1,013	1.50		-0.035
0.1949	30	20,000	1000	188	1,020	1.50		-0.035
0.1960	30	20,000	1000	188	1,026	1.50		-0.035
0.1969	20	20,000	1000	188	1,031	1.00		-0.035
0.1988	20	20,000	1000	188	1,041	1.00		-0.035
0.1990	20	20,000	1000	188	1,042	1.00		-0.035
0.2008	20	20,000	1000	188	1,051	1.00		-0.035
0.2010	20	20,000	1000	188	1,052	1.00		-0.035
0.2028	20	20,000	1000	188	1,062	1.00		-0.035
0.2031	20	20,000	1000	188	1,063	1.00		-0.035
0.2040	20	20,000	1000	188	1,068	1.00		-0.035
0.2047	20	20,000	1000	188	1,072	1.00		-0.035
0.2055	20	20,000	1000	188	1,076	1.00		-0.035
0.2067	20	20,000	1000	188	1,082	1.00		-0.035
0.2087	20	20,000	1000	188	1,093	1.00		-0.035
0.2090	20	20,000	1000	188	1,094	1.00		-0.035
0.2106	20	20,000	1000	188	1,103	1.00		-0.035
0.2126	20	20,000	1000	188	1,113	1.00		-0.035
0.2130	20	20,000	1000	188	1,115	1.00		-0.035
0.2146	20	20,000	1000	188	1,124	1.00		-0.035
0.2165	20	20,000	1000	188	1,134	1.00		-0.035
0.2185	20	20,000	1000	188	1,144	1.00		-0.035
0.2188	20	20,000	1000	188	1,146	1.00		-0.035
0.2205	20	20,000	1000	188	1,155	1.00		-0.035
0.2210	20	20,000	1000	188	1,157	1.00		-0.035
0.2224	20	20,000	1000	188	1,164	1.00		-0.035
0.2244	20	20,000	1000	188	1,175	1.00		-0.035
0.2264	20	20,000	1000	188	1,185	1.00		-0.035
0.2280	20	20,000	1000	188	1,194	1.00		-0.035
0.2283	20	20,000	1000	188	1,195	1.00		-0.035
0.2303	20	20,000	1000	188	1,206	1.00		-0.035



MAX RPM 100000
 MAX SFM *Small* 425 (0.0039" - 0.0295")
 MAX SFM *Large* 425 (0.0310" - 0.2770")
 MAX CL *Small* 2.50 mils (0.0039" - 0.0295")
 MAX CL *Large* 2.75 mils (0.0310" - 0.1516")
 MAX HIT COUNT 1500
 MATERIAL GETEK® THIN PANELS
 CUSTOMER *Baseline Feed & Speed*
 SERIES 15, 503 & 508



Baseline Feed & Speed

Maximum RPM: 100,000

Material: GETEK® THIN PANELS

Recommended Series: 15, 503, 508

								SUGGESTED
DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.	OFFSET	
0.2323	20	20,000	1000	188	1,216	1.00	-0.035	
0.2340	20	20,000	1000	188	1,225	1.00	-0.035	
0.2343	20	20,000	1000	188	1,227	1.00	-0.035	
0.2344	20	20,000	1000	188	1,227	1.00	-0.035	
0.2362	20	20,000	1000	188	1,237	1.00	-0.035	
0.2380	20	20,000	1000	188	1,246	1.00	-0.035	
0.2382	20	20,000	1000	188	1,247	1.00	-0.035	
0.2402	20	20,000	1000	188	1,258	1.00	-0.035	
0.2420	20	20,000	1000	188	1,267	1.00	-0.035	
0.2421	20	20,000	1000	188	1,268	1.00	-0.035	
0.2441	20	20,000	1000	188	1,278	1.00	-0.035	
0.2460	20	20,000	1000	188	1,288	1.00	-0.035	
0.2480	20	20,000	1000	188	1,299	1.00	-0.035	
0.2500	20	20,000	1000	75	1,309	1.00	-0.035	
0.2520	20	20,000	1000	75	1,319	1.00	-0.035	
0.2559	20	20,000	1000	75	1,340	1.00	-0.035	
0.2570	20	20,000	1000	75	1,346	1.00	-0.035	
0.2598	20	20,000	1000	75	1,360	1.00	-0.035	
0.2610	20	20,000	1000	75	1,367	1.00	-0.035	
0.2638	20	20,000	1000	75	1,381	1.00	-0.035	
0.2656	20	20,000	1000	75	1,391	1.00	-0.035	
0.2657	20	20,000	1000	75	1,391	1.00	-0.035	
0.2660	20	20,000	1000	75	1,393	1.00	-0.035	
0.2677	20	20,000	1000	75	1,402	1.00	-0.035	
0.2717	20	20,000	1000	75	1,423	1.00	-0.035	
0.2720	20	20,000	1000	75	1,424	1.00	-0.035	
0.2756	20	20,000	1000	75	1,443	1.00	-0.035	
0.2770	20	20,000	1000	75	1,450	1.00	-0.035	



MAX RPM 100,000
 MAX SEM Small 375 (0.0039" - 0.0295")
 MAX SEM Large 425 (0.0310" - 0.2770")
 MAX CL Small 2.5 mils (0.0039" - 0.0295")
 MAX CL Large 2.75 mils (0.0310" - 0.1516")
 MAX HIT COUNT 1500
 MATERIAL GETEK® - Thick Panel
 CUSTOMER Baseline Feed & Speed
 SERIES 504 & 15



Baseline Feeds & Speeds

Maximum RPM: 100,000

Material Type: GETEK® THICK PANEL

Recommended Series: 504 & 15

DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.	SUGGESTED OFFSET
0.0039	14	100,000	100	188	102	0.14	-0.004
0.0051	16	100,000	100	188	134	0.16	-0.005
0.0059	17	100,000	100	188	154	0.17	-0.006
0.0063	19	100,000	100	188	165	0.19	-0.006
0.0067	22	100,000	100	188	175	0.22	-0.007
0.0071	26	100,000	100	188	186	0.26	-0.007
0.0075	29	100,000	100	188	196	0.29	-0.008
0.0079	31	100,000	100	188	207	0.31	-0.008
0.0083	36	100,000	100	375	217	0.36	-0.008
0.0087	40	100,000	250	375	228	0.40	-0.009
0.0091	45	100,000	250	375	238	0.45	-0.009
0.0095	50	100,000	250	375	249	0.50	-0.010
0.0098	53	100,000	250	375	257	0.53	-0.010
0.0100	55	100,000	250	563	262	0.55	-0.010
0.0105	61	100,000	250	563	275	0.61	-0.011
0.0110	66	100,000	500	563	288	0.66	-0.011
0.0115	71	100,000	500	750	301	0.71	-0.012
0.0118	73	100,000	500	750	309	0.73	-0.012
0.0120	75	100,000	500	750	314	0.75	-0.012
0.0125	76	100,000	500	750	327	0.76	-0.013
0.0130	79	100,000	1000	750	340	0.79	-0.013
0.0135	81	100,000	1000	1125	353	0.81	-0.014
0.0138	83	100,000	1000	1125	361	0.83	-0.014
0.0145	83	98,800	1000	1125	375	0.84	-0.015
0.0156	84	91,800	1000	1125	375	0.91	-0.016
0.0157	84	91,200	1000	1125	375	0.92	-0.016
0.0160	84	89,500	1000	1125	375	0.94	-0.016
0.0177	78	80,900	1000	1125	375	0.96	-0.018
0.0180	78	79,600	1000	1125	375	0.98	-0.018
0.0197	78	72,700	1000	1500	375	1.08	-0.020
0.0200	79	71,600	1000	1500	375	1.10	-0.020
0.0210	79	68,200	1000	1500	375	1.16	-0.021



MAX RPM	100,000
MAX SFM Small	375 (0.0039" - 0.0295")
MAX SFM Large	425 (0.0310" - 0.2770")
MAX CL Small	2.5 mils (0.0039" - 0.0295")
MAX CL Large	2.75 mils (0.0310" - 0.1516")
MAX HIT COUNT	1500
MATERIAL	GETEK® - Thick Panel
CUSTOMER	Baseline Feed & Speed
SERIES	504 & 15



Baseline Feeds & Speeds

Maximum RPM: 100,000

Material Type: GETEK® THICK PANEL

Recommended Series: 504 & 15

DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.	SUGGESTED OFFSET
0.0217	81	66,000	1000	1500	375	1.23	-0.022
0.0225	82	63,700	1000	1500	375	1.28	-0.023
0.0236	82	60,700	1000	1500	375	1.35	-0.024
0.0240	82	59,700	1000	1500	375	1.37	-0.024
0.0250	83	57,300	1000	1500	375	1.45	-0.025
0.0256	85	56,000	1000	1500	375	1.51	-0.026
0.0260	87	55,100	1000	1500	375	1.58	-0.026
0.0276	89	51,900	1000	1500	375	1.71	-0.028
0.0280	92	51,200	1000	1500	375	1.79	-0.028
0.0292	93	49,100	1000	1500	375	1.90	-0.029
0.0295	95	48,600	1000	1500	375	1.95	-0.030
0.0310	120	52,400	1000	1500	425	2.30	-0.030
0.0312	121	52,000	1000	1500	425	2.32	-0.030
0.0315	122	51,500	1000	1500	425	2.37	-0.030
0.0320	123	50,700	1000	1500	425	2.42	-0.030
0.0330	127	49,200	1000	1500	425	2.57	-0.030
0.0335	127	48,500	1000	1500	425	2.61	-0.030
0.0350	126	46,400	1000	1500	425	2.72	-0.030
0.0354	126	45,900	1000	1500	425	2.75	-0.030
0.0360	124	45,100	1000	1500	425	2.75	-0.030
0.0370	121	43,900	1000	1500	425	2.75	-0.030
0.0374	119	43,400	1000	1500	425	2.75	-0.030
0.0380	117	42,700	1000	1500	425	2.75	-0.030
0.0390	114	41,600	1000	1500	425	2.75	-0.030
0.0394	113	41,200	1000	1500	425	2.75	-0.030
0.0400	112	40,600	1000	1500	425	2.75	-0.030
0.0410	109	39,600	1000	1500	425	2.75	-0.030
0.0413	108	39,300	1000	1500	425	2.75	-0.030
0.0420	106	38,700	1000	1500	426	2.75	-0.030
0.0430	104	37,800	1000	1500	426	2.75	-0.030
0.0433	103	37,500	1000	1500	425	2.75	-0.030
0.0441	101	36,800	1000	1500	425	2.75	-0.030



MAX RPM	100,000
MAX SFM Small	375 (0.0039" - 0.0295")
MAX SFM Large	425 (0.0310" - 0.2770")
MAX CL Small	2.5 mils (0.0039" - 0.0295")
MAX CL Large	2.75 mils (0.0310" - 0.1516")
MAX HIT COUNT	1500
MATERIAL	GETEK® - Thick Panel
CUSTOMER SERIES	Baseline Feed & Speed 504 & 15



Baseline Feeds & Speeds

Maximum RPM: 100,000

Material Type: GETEK® THICK PANEL

Recommended Series: 504 & 15

DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.	SUGGESTED OFFSET
0.0453	98	35,800	1000	1500	425	2.75	-0.030
0.0465	96	34,900	1000	1500	425	2.75	-0.030
0.0469	95	34,600	1000	1500	425	2.75	-0.030
0.0472	95	34,400	1000	1500	425	2.75	-0.030
0.0492	91	33,000	1000	1125	425	2.75	-0.030
0.0512	87	31,700	1000	1125	425	2.75	-0.030
0.0520	86	31,200	1000	1125	425	2.75	-0.030
0.0531	84	30,600	1000	1125	425	2.75	-0.030
0.0550	81	29,500	1000	1125	425	2.75	-0.030
0.0551	81	29,500	1000	1125	426	2.75	-0.030
0.0571	78	28,400	1000	1125	425	2.75	-0.030
0.0591	76	27,500	1000	1125	425	2.75	-0.030
0.0595	75	27,300	1000	1125	425	2.75	-0.030
0.0610	73	26,600	1000	1125	425	2.75	-0.030
0.0625	72	26,000	1000	1125	425	2.75	-0.030
0.0630	71	25,800	1000	1125	426	2.75	-0.030
0.0635	70	25,600	1000	1125	426	2.75	-0.030
0.0650	69	25,000	1000	1125	425	2.75	-0.030
0.0669	67	24,300	1000	1125	426	2.75	-0.035
0.0670	67	24,200	1000	1125	424	2.75	-0.035
0.0689	65	23,600	1000	1125	426	2.75	-0.035
0.0700	64	23,200	1000	1125	425	2.75	-0.035
0.0709	63	22,900	1000	1125	425	2.75	-0.035
0.0728	61	22,300	1000	750	425	2.75	-0.035
0.0730	61	22,200	1000	750	424	2.75	-0.035
0.0748	60	21,700	1000	750	425	2.75	-0.035
0.0760	59	21,400	1000	750	426	2.75	-0.035
0.0768	58	21,100	1000	750	424	2.75	-0.035
0.0781	57	20,800	1000	750	425	2.75	-0.035
0.0785	57	20,700	1000	750	425	2.75	-0.035
0.0787	57	20,600	1000	750	424	2.75	-0.035
0.0807	55	20,100	1000	750	425	2.75	-0.035
0.0810	55	20,000	1000	750	424	2.75	-0.035



MAX RPM	100,000
MAX SFM Small	375 (0.0039" - 0.0295")
MAX SFM Large	425 (0.0310" - 0.2770")
MAX CL Small	2.5 mils (0.0039" - 0.0295")
MAX CL Large	2.75 mils (0.0310" - 0.1516")
MAX HIT COUNT	1500
MATERIAL	GETEK® - Thick Panel
CUSTOMER	Baseline Feed & Speed
SERIES	504 & 15



Baseline Feeds & Speeds

Maximum RPM: 100,000

Material Type: GETEK® THICK PANEL

Recommended Series: 504 & 15

DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.	SUGGESTED OFFSET
0.0820	55	20,000	1000	750	429	2.75	-0.035
0.0827	55	20,000	1000	750	433	2.75	-0.035
0.0846	55	20,000	1000	750	443	2.75	-0.035
0.0860	55	20,000	1000	750	450	2.75	-0.035
0.0866	55	20,000	1000	750	453	2.75	-0.035
0.0886	55	20,000	1000	750	464	2.75	-0.035
0.0890	55	20,000	1000	750	466	2.75	-0.035
0.0906	55	20,000	1000	563	474	2.75	-0.035
0.0925	55	20,000	1000	563	484	2.75	-0.035
0.0935	55	20,000	1000	563	490	2.75	-0.035
0.0938	55	20,000	1000	563	491	2.75	-0.035
0.0945	55	20,000	1000	563	495	2.75	-0.035
0.0960	55	20,000	1000	563	503	2.75	-0.035
0.0965	55	20,000	1000	563	505	2.75	-0.035
0.0980	55	20,000	1000	563	513	2.75	-0.035
0.0984	55	20,000	1000	563	515	2.75	-0.035
0.0995	55	20,000	1000	563	521	2.75	-0.035
0.1004	55	20,000	1000	563	526	2.75	-0.035
0.1015	55	20,000	1000	563	531	2.75	-0.035
0.1024	55	20,000	1000	563	536	2.75	-0.035
0.1040	55	20,000	1000	563	545	2.75	-0.035
0.1043	55	20,000	1000	563	546	2.75	-0.035
0.1063	55	20,000	1000	563	557	2.75	-0.035
0.1065	55	20,000	1000	563	558	2.75	-0.035
0.1083	55	20,000	1000	563	567	2.75	-0.035
0.1094	55	20,000	1000	563	573	2.75	-0.035
0.1100	55	20,000	1000	563	576	2.75	-0.035
0.1102	55	20,000	1000	563	577	2.75	-0.035
0.1110	55	20,000	1000	563	581	2.75	-0.035
0.1122	55	20,000	1000	563	587	2.75	-0.035
0.1130	55	20,000	1000	563	592	2.75	-0.035



MAX RPM	100,000
MAX SFM Small	375 (0.0039" - 0.0295")
MAX SFM Large	425 (0.0310" - 0.2770")
MAX CL Small	2.5 mils (0.0039" - 0.0295")
MAX CL Large	2.75 mils (0.0310" - 0.1516")
MAX HIT COUNT	1500
MATERIAL	GETEK® - Thick Panel
CUSTOMER	Baseline Feed & Speed
SERIES	504 & 15



Baseline Feeds & Speeds

Maximum RPM: 100,000

Material Type: GETEK® THICK PANEL

Recommended Series: 504 & 15

DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.	SUGGESTED OFFSET
0.1142	55	20,000	1000	563	598	2.75	-0.035
0.1160	55	20,000	1000	563	607	2.75	-0.035
0.1161	55	20,000	1000	563	608	2.75	-0.035
0.1181	55	20,000	1000	563	618	2.75	-0.035
0.1200	47	20,000	1000	563	628	2.36	-0.035
0.1220	47	20,000	1000	563	639	2.36	-0.035
0.1240	47	20,000	1000	563	649	2.36	-0.035
0.1250	47	20,000	1000	563	654	2.36	-0.035
0.1260	47	20,000	1000	375	660	2.36	-0.035
0.1280	47	20,000	1000	375	670	2.36	-0.035
0.1285	47	20,000	1000	375	673	2.36	-0.035
0.1299	47	20,000	1000	375	680	2.36	-0.035
0.1319	47	20,000	1000	375	691	2.36	-0.035
0.1339	47	20,000	1000	375	701	2.36	-0.035
0.1358	31	20,000	1000	375	711	1.57	-0.035
0.1360	31	20,000	1000	375	712	1.57	-0.035
0.1378	31	20,000	1000	375	722	1.57	-0.035
0.1398	31	20,000	1000	375	732	1.57	-0.035
0.1405	31	20,000	1000	375	736	1.57	-0.035
0.1406	31	20,000	1000	375	736	1.57	-0.035
0.1417	31	20,000	1000	375	742	1.57	-0.035
0.1437	31	20,000	1000	375	752	1.57	-0.035
0.1440	31	20,000	1000	375	754	1.57	-0.035
0.1457	31	20,000	1000	375	763	1.57	-0.035
0.1470	31	20,000	1000	375	770	1.57	-0.035
0.1476	31	20,000	1000	375	773	1.57	-0.035
0.1495	31	20,000	1000	375	783	1.57	-0.035
0.1496	31	20,000	1000	375	783	1.57	-0.035
0.1516	31	20,000	1000	375	794	1.57	-0.035
0.1520	30	20,000	1000	375	796	1.50	-0.035
0.1535	30	20,000	1000	188	804	1.50	-0.035
0.1540	30	20,000	1000	188	806	1.50	-0.035



MAX RPM	100,000
MAX SFM Small	375 (0.0039" - 0.0295")
MAX SFM Large	425 (0.0310" - 0.2770")
MAX CL Small	2.5 mils (0.0039" - 0.0295")
MAX CL Large	2.75 mils (0.0310" - 0.1516")
MAX HIT COUNT	1500
MATERIAL	GETEK® - Thick Panel
CUSTOMER	Baseline Feed & Speed
SERIES	504 & 15



Baseline Feeds & Speeds

Maximum RPM: 100,000

Material Type: GETEK® THICK PANEL

Recommended Series: 504 & 15

DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.	SUGGESTED
							OFFSET
0.1555	30	20,000	1000	188	814	1.50	-0.035
0.1562	30	20,000	1000	188	818	1.50	-0.035
0.1570	30	20,000	1000	188	822	1.50	-0.035
0.1575	30	20,000	1000	188	825	1.50	-0.035
0.1590	30	20,000	1000	188	833	1.50	-0.035
0.1594	30	20,000	1000	188	835	1.50	-0.035
0.1610	30	20,000	1000	188	843	1.50	-0.035
0.1614	30	20,000	1000	188	845	1.50	-0.035
0.1634	30	20,000	1000	188	856	1.50	-0.035
0.1654	30	20,000	1000	188	866	1.50	-0.035
0.1660	30	20,000	1000	188	869	1.50	-0.035
0.1673	30	20,000	1000	188	876	1.50	-0.035
0.1693	30	20,000	1000	188	886	1.50	-0.035
0.1695	30	20,000	1000	188	887	1.50	-0.035
0.1713	30	20,000	1000	188	897	1.50	-0.035
0.1719	30	20,000	1000	188	900	1.50	-0.035
0.1730	30	20,000	1000	188	906	1.50	-0.035
0.1732	30	20,000	1000	188	907	1.50	-0.035
0.1752	30	20,000	1000	188	917	1.50	-0.035
0.1770	30	20,000	1000	188	927	1.50	-0.035
0.1772	30	20,000	1000	188	928	1.50	-0.035
0.1791	30	20,000	1000	188	938	1.50	-0.035
0.1800	30	20,000	1000	188	942	1.50	-0.035
0.1811	30	20,000	1000	188	948	1.50	-0.035
0.1820	30	20,000	1000	188	953	1.50	-0.035
0.1831	30	20,000	1000	188	959	1.50	-0.035
0.1850	30	20,000	1000	188	969	1.50	-0.035
0.1870	30	20,000	1000	188	979	1.50	-0.035
0.1875	30	20,000	1000	188	982	1.50	-0.035
0.1890	30	20,000	1000	188	990	1.50	-0.035
0.1909	30	20,000	1000	188	1,000	1.50	-0.035
0.1910	30	20,000	1000	188	1,000	1.50	-0.035



MAX RPM	100,000
MAX SFM Small	375 (0.0039" - 0.0295")
MAX SFM Large	425 (0.0310" - 0.2770")
MAX CL Small	2.5 mils (0.0039" - 0.0295")
MAX CL Large	2.75 mils (0.0310" - 0.1516")
MAX HIT COUNT	1500
MATERIAL	GETEK® - Thick Panel
CUSTOMER	Baseline Feed & Speed
SERIES	504 & 15



Baseline Feeds & Speeds

Maximum RPM: 100,000

Material Type: GETEK® THICK PANEL

Recommended Series: 504 & 15

DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.	SUGGESTED OFFSET
0.1929	30	20,000	1000	188	1,010	1.50	-0.035
0.1935	30	20,000	1000	188	1,013	1.50	-0.035
0.1949	30	20,000	1000	188	1,020	1.50	-0.035
0.1960	30	20,000	1000	188	1,026	1.50	-0.035
0.1969	20	20,000	1000	188	1,031	1.00	-0.035
0.1988	20	20,000	1000	188	1,041	1.00	-0.035
0.1990	20	20,000	1000	188	1,042	1.00	-0.035
0.2008	20	20,000	1000	188	1,051	1.00	-0.035
0.2010	20	20,000	1000	188	1,052	1.00	-0.035
0.2028	20	20,000	1000	188	1,062	1.00	-0.035
0.2031	20	20,000	1000	188	1,063	1.00	-0.035
0.2040	20	20,000	1000	188	1,068	1.00	-0.035
0.2047	20	20,000	1000	188	1,072	1.00	-0.035
0.2055	20	20,000	1000	188	1,076	1.00	-0.035
0.2067	20	20,000	1000	188	1,082	1.00	-0.035
0.2087	20	20,000	1000	188	1,093	1.00	-0.035
0.2090	20	20,000	1000	188	1,094	1.00	-0.035
0.2106	20	20,000	1000	188	1,103	1.00	-0.035
0.2126	20	20,000	1000	188	1,113	1.00	-0.035
0.2130	20	20,000	1000	188	1,115	1.00	-0.035
0.2146	20	20,000	1000	188	1,124	1.00	-0.035
0.2165	20	20,000	1000	188	1,134	1.00	-0.035
0.2185	20	20,000	1000	188	1,144	1.00	-0.035
0.2188	20	20,000	1000	188	1,146	1.00	-0.035
0.2205	20	20,000	1000	188	1,155	1.00	-0.035
0.2210	20	20,000	1000	188	1,157	1.00	-0.035
0.2224	20	20,000	1000	188	1,164	1.00	-0.035
0.2244	20	20,000	1000	188	1,175	1.00	-0.035
0.2264	20	20,000	1000	188	1,185	1.00	-0.035
0.2280	20	20,000	1000	188	1,194	1.00	-0.035
0.2283	20	20,000	1000	188	1,195	1.00	-0.035
0.2303	20	20,000	1000	188	1,206	1.00	-0.035



MAX RPM	100,000
MAX SFM Small	375 (0.0039" - 0.0295")
MAX SFM Large	425 (0.0310" - 0.2770")
MAX CL Small	2.5 mils (0.0039" - 0.0295")
MAX CL Large	2.75 mils (0.0310" - 0.1516")
MAX HIT COUNT	1500
MATERIAL	GETEK® - Thick Panel
CUSTOMER	Baseline Feed & Speed
SERIES	504 & 15



Baseline Feeds & Speeds

Maximum RPM: 100,000

Material Type: GETEK® THICK PANEL

Recommended Series: 504 & 15

DIAMETER	FEED	R.P.M.	RETRACT	MAX HITS	S.F.M.	C.L.	SUGGESTED OFFSET
0.2323	20	20,000	1000	188	1,216	1.00	-0.035
0.2340	20	20,000	1000	188	1,225	1.00	-0.035
0.2343	20	20,000	1000	188	1,227	1.00	-0.035
0.2344	20	20,000	1000	188	1,227	1.00	-0.035
0.2362	20	20,000	1000	188	1,237	1.00	-0.035
0.2380	20	20,000	1000	188	1,246	1.00	-0.035
0.2382	20	20,000	1000	188	1,247	1.00	-0.035
0.2402	20	20,000	1000	188	1,258	1.00	-0.035
0.2420	20	20,000	1000	188	1,267	1.00	-0.035
0.2421	20	20,000	1000	188	1,268	1.00	-0.035
0.2441	20	20,000	1000	188	1,278	1.00	-0.035
0.2460	20	20,000	1000	188	1,288	1.00	-0.035
0.2480	20	20,000	1000	188	1,299	1.00	-0.035
0.2500	20	20,000	1000	75	1,309	1.00	-0.035
0.2520	20	20,000	1000	75	1,319	1.00	-0.035
0.2559	20	20,000	1000	75	1,340	1.00	-0.035
0.2570	20	20,000	1000	75	1,346	1.00	-0.035
0.2598	20	20,000	1000	75	1,360	1.00	-0.035
0.2610	20	20,000	1000	75	1,367	1.00	-0.035
0.2638	20	20,000	1000	75	1,381	1.00	-0.035
0.2656	20	20,000	1000	75	1,391	1.00	-0.035
0.2657	20	20,000	1000	75	1,391	1.00	-0.035
0.2660	20	20,000	1000	75	1,393	1.00	-0.035
0.2677	20	20,000	1000	75	1,402	1.00	-0.035
0.2717	20	20,000	1000	75	1,423	1.00	-0.035
0.2720	20	20,000	1000	75	1,424	1.00	-0.035
0.2756	20	20,000	1000	75	1,443	1.00	-0.035
0.2770	20	20,000	1000	75	1,450	1.00	-0.035

