

# WCL'S MATERIAL AND FINISH CODES

## MATERIALS AND FINISHES

Most of the washers shown in this catalog are available in the following materials and finishes.

### Materials

C1050 Spring Steel  
400 Series Stainless Steel  
300 Series Stainless Steel  
Bronze  
Aluminum  
Beryllium Copper  
K-Monel

### Finishes

Plain  
Zinc, .00015" thick

Other materials and finishes are available on special request.

## APPROVALS

Shakeproof Lockwashers qualify under the majority of Standards requirements established by the Armed Forces, American Standards Association, the Society of Automotive Engineers and the American Society of Mechanical Engineers for components of this type.

### Military Specifications

MS 3533, MS 35334, MS 35335, MS 35336 and MS 45904

### American Society of Mechanical Engineers

ASME B 18.21.1

### Federal Specifications

FF-W-100

### Laboratory Accreditation

ITW Shakeproof (Elgin) A2LA Approved

## METRIC SIZES

External Tooth and Internal Tooth washers are available in metric sizes to DIN 6797-A and DIN 6797-J, respectively. Most other types of tooth washers are available in metric soft conversions. Please inquire with WCL sales for specification charts that are available to be faxed on soft conversions to ITW standards.

**NOTE:** All data in this catalog is presented as a general guide. The configuration of some special parts may vary slightly from the typical products depicted in photographs and drawings. Specifications are subject to modification without notice. Extended inactivity may result in discontinuance of individual parts without notice. It may be helpful to request a sales print before ordering a new part.

# MIL-SPEC TEST REQUIREMENTS

Any specifications for **MIL-SPEC** hardware (such as **AN**, **MS** and **NAS** parts) includes the tests that parts are required to pass to qualify as **MIL-SPEC** parts.

As a service to its valued customers, **WCL** offers the following as a general guide to test and certification requirements for the **MIL-SPEC** hardware items it sells.

## FLAT WASHERS

MIL-SPEC designations for flat washers include, but are not limited to, **AN960**, **MS15795**, **MS27183**, **NAS620**, and **NAS1252**. These are covered by military procurement specification **FF-W-92** which has, as minimum requirements.

- |   |   |
|---|---|
| 1. Chemical analysis                          | 3. Workmanship                                  |
| 2. Process certification on protective finish | 4. Magnetic permeability (stainless steel only) |

## HELICAL SPRING LOCKWASHERS

MIL-SPEC designations include, but are not limited to, **MS35338**, **MS35340**, **MS51848**, **NAS1640** and **NAS1676**. These are covered by military procurement specification **ASME B18.21.1** or **FF-W-84** which has some, or all, of the following.

- |                      |  |
|----------------------|--|
| 1. Interlinking test | 6. Chemical analysis (mill certification acceptable) |
| 2. Free height test  | 7. Magnetic permeability (on stainless steel)        |
| 3. Twist test        | 8. Process certification on protective finish        |
| 4. Pressure test     | 9. Decarb test (on carbon steel)                     |
| 5. Hardness test     | 10. Embrittlement test (electro plated)              |

## SPRING WASHERS - CURVED, WAVE AND BELLEVILLE

MIL-SPEC designations for spring washers include but are not limited to, **M12133/1** and **M12133/2** and are covered by military specification **MIL-W-12133** which has, as minimum requirements:

- |  |  |
|--|--|
| 1. Chemical analysis   | 5. Decarburization (carbon steel only) |
| 2. Process certification on protective coating and surface treatment | 6. Load Deflection                     |
| 3. Inspection for cracks   | 7. Permanent set                       |
| 4. Hardness test   | 8. Repeated loading                    |

## TOOTH LOCKWASHERS

MIL-SPEC designations for tooth lockwashers include, but are not limited to **MS35333**, **MS35335**, **MS35336**, **MS35790** and **MS45904**. These are covered by military procurement specification **ASME B18.21.1** or **FF-W-100** which has some or all of the following.

- |   |  |
|---|--|
| 1. Hardness test                              | 5. Spread test                         |
| 2. Process certification on protective finish | 6. Twist test                          |
| 3. Chemical analysis                          | 7. Temper test                         |
| 4. Compression and flattening test            | 8. Decarb test (on carbon steel)       |
|   | 9. Embrittlement test (electro plated) |

The above list provides a guide relating to the most popular types of MIL-SPEC washers. It should not be construed as a complete list of all military specifications and documents pertaining to washers or as a list of all tests or analysis that may be required.

Many OEM's also have special requirements (including testing) that must be met to be in compliance with their part specifications and purchase requirements.

Review all relevant documents carefully before requesting quotations to avoid unexpected costs for testing and analysis. When in doubt, discuss the requirements with your WCL sales associates.

Remember, if it has not been properly tested, it is not MIL-SPEC hardware.

## CERTIFICATIONS AVAILABLE

WCL Company maintains quality control per MIL-I-45208A and maintains certification on most parts for a minimum of seven years after date of purchase. Certifications on file at WCL Company are available for customer or government review, at our facility, upon reasonable request.

The following are some of the Certificates of Compliance and test results available from WCL Company for certifications on file.

TYPE	SOURCE
<b>CERTIFICATES OF COMPLIANCE</b>	<p>WCL Company - certifies part compliance with customers purchase order. Comes standard with every order. <span style="float: right;">No Charge</span></p> <p>In most cases, manufacturer's Certificates of Compliance can be supplied on request. Please note: WCL Company's suppliers have their own part numbers which may appear on certifications and may or may not be the same as Military and/or O.E.M. part numbers. <span style="float: right;">\$20.00</span></p>
<b>CHEMICAL AND HARDNESS TESTS</b>	<p>Test results can be provided on WCL letterhead as verified by our supplier or by independent laboratory test. <span style="float: right;">\$10.00</span></p> <p>Most results can also be provided on manufacturer's letterhead. <span style="float: right;">\$20.00</span></p>
<b>PROCUREMENT SPECIFICATION REQUIREMENTS</b>	<p>Compliance with procurement specification requirements, as tested by one or more of the following: our supplier, independent laboratory and/or WCL Quality Control Department, can be certified on WCL letterhead. <span style="float: right;">\$10.00</span></p> <p>Certification similar to the above, on manufacturer's letterhead, can be provided in most cases <span style="float: right;">\$30.00</span></p>
<b>PLATING</b>	<p>In most cases, copies of plating certifications from plating processors can be supplied on request. <span style="float: right;">\$10.00</span></p>
<b>MISCELLANEOUS</b>	<p>Not all tests and required certifications are listed above. If the test certification you require is not shown, check with your WCL sales representatives.</p>
<b>ORDERING INFORMATION</b>	<p>An example of a WCL part number reads as follows: FW-0266-0625-049-ST1-ZN1</p> <p style="text-align: center;"> <u>FW</u>   <u>.266</u>   <u>.625</u>   <u>.049</u>   <u>ST1</u>   <u>ZN1</u>   MAT=Material   ST1=Commercial Steel  Type   I.D.   O.D.   THK.   MAT   FIN   FIN=Finish   ZN1=Zinc and Clear </p>