Section Title: Appendix - Sections

Document Title: Pratt & Whitney Materials Control Laboratory Qualified Commercial Laboratory List

APPLIES TO: **Pratt & Whitney Group**

1. PURPOSE AND SCOPE:

This Appendix provides a listing of Commercial Laboratories Qualified by the Pratt & Whitney Group, Materials Control Laboratory (a.k.a. Quality & Standards Laboratory), and identifies the Type of Testing that each listed Laboratory is qualified for.

2. OWNERSHIP AND APPROVAL:

The Chief, Quality & Standards Laboratories (Q&SL), PW South & Supervisor Supplier Metallurgical Development PW North, are the owners of this procedure. All revisions to this procedure must be approved by the owners and balloted in accordance with MCL Manual Section C-5.

3. DEFINITIONS:

3.1 **Pratt & Whitney Group** – encompasses both Pratt & Whitney Canada (PW North) and Pratt &Whitney US (PW South).

3.2 **Semi-quantitative Spectrographic Analysis** – The Determination of a material's chemistry to detect the presence of the alloying elements to a degree by which a positive identification can be made as to the alloy type, as well as the ability to distinguish between similar alloys.

3.3 **Quantitative Spectrographic Analysis** – P&W defines quantitative spectrographic analysis as "utilization of a least squares calibration curve".

3.4 **Wet Chemical Analysis** – P&W defines wet chemical analysis as "gravimetric or titrametric analysis".

3.5 **Optical Emission Spectroscopy (OES)** – OES is defined as testing which utilizes "ICP (Inductively Coupled Plasma), DCP (Direct Current Plasma) and DR (Direct Reader)".

4. PROCEDURE:

4.1 The commercial laboratories listed in Table I and Table II have been reviewed by Pratt & Whitney-Materials Group Control Laboratory (P&W-MCL) and found capable of performing the types of tests for which they are listed. This list shall not be construed as a guarantee by P&W-MCL that testing will be done properly, nor does it relieve the supplier from his contractual obligation to deliver conforming materials and parts based on accurate and valid test results.

4.2 The listing of a laboratory in the applicable Tables signifies only that, at the time of review, the laboratory was found capable of performing the tests for which it is listed. The laboratory is not relieved of responsibility for continued conformance as determined by calibrations and operational checks of testing and measuring equipment.

4.3 This list shall not be reproduced without written permission from P&W-MCL and should not be considered completely up-to-date at any time, as deletions and additions may be made by P&W-MCL.

4.4 Laboratories listed in Table I are required to comply with MCL Manual Section F-23, "Test and Calibration Requirements for Commercial and In-House Laboratories", when that section is specified on orders from their customers. Failure to comply with MCL-Manual Section F-23 will disqualify the laboratory as a testing source for materials or parts.

4.4.1 Laboratories listed in Table I shall forward test specimens together with the applicable test results to P&W-MCL for correlation testing on a yearly basis as outlined in MCL Manual Section F-23. MCL Form 404 (See MCL Manual Section F-23) will be submitted with all correlation testing packages.

4.5 Laboratories listed in Table II are required to comply with MCL Manual Section FC-23, "Test and Calibration Requirements for Commercial and In-House Laboratories", when that section is specified on orders from their customers. Failure to comply with MCL-Manual Section FC-23 will disqualify the laboratory as a testing source for materials or parts.

4.6 At the discretion of P&W-MCL, any laboratory may be removed from this listing when no longer deemed qualified or when the services are no longer required by P&W or its subcontractors.

4.7 The following laboratories may be used for qualitative analysis using mass spectrograph for information only and will not be surveyed:

- Accu-Labs Research, Inc.
  11485 West 48th Avenue
  Wheat Ridge, CO 80033

- Commercial Testing & Engineering Company
  Instrumental Analysis Division
  14335 West 44th Avenue
  Golden, CO 80401

- Ledoux & Company
  359 Alfred Avenue
  Teaneck, NJ 07666

- Shiva Technologies Inc.
  6707 Brooklawn Parkway
  Syracuse, NY 13211

5. FORMS:

- MCL Form 404

6. REFERENCES:

- MCL Manual Section F-23
- MCL Manual Section FC-23
- MCL Manual Section S-8

7. **NATURE OF CHANGE FOR THIS ISSUE:**

- Table 1 updated:
  - Removed Durkee Test Labs ,15700 Texaco Street Paramount, California 90723. The company was closed on March 8th 2017.

P&W - MCL - Qualified Commercial Laboratory - Table I

Yellow highlighted fields represent correlation testing per MCLM F23.

Light blue highlighted fields represent labs found capable to perform this type of test.

Light green highlighted fields with letters represent specific test recognitions.

	Commercial Laboratories	Tensile, Room Temperature	Tensile, Elevated Temperature	Stress Rupture	Creep Rupture	Hardness	Impact	Metallographic Examination - All Others (See Note 10)	ME - Microstructure/Grainsize (See Note 10)	ME - Abusive Machining E166 Supp A (See Note 10)	ME - Surface Contamination of Titanium (See Note 10)	ME - Braze (See Note 10)	ME - Weld (See Note 10)	ME - Nonconventional Machining, ECMR, EDMR, LBMR, EBMR (See Note 10)	ME - Fasteners (See Note 10)	ME - Heat Treat (See Note 10)	ME - Coatings (Vapor/Pack/Thermal) (Commercial Labs by Exception Only) (See Note 10)	Wet Chemical Analysis (See Note 2)	OES Quantitative Spectrographic Analysis (See Notes 3, 4, & 5)	Salt Spray	Heat Treating (to condition lab specimens)	Gas Analysis - Combustion (C, S)	Gas Analysis - Inert Gas Fusion O-Oxygen, N-Nitrogen, H-Hydrogen	Semi-quantitative Analysis (See Note 1)	Sieve Analysis	Plastics (See Note 8)	Rubber Materials including Polymers (See Note 8)	Atomic Absorption (See Notes 5 & 6)	AA - Tramp Elements (See Notes 5 & 6)	XRF Quantitative Spectrographic Analysis - All Others (See Notes 4 & 5)	XRD (See Note 7)	Fatigue	Fracture Toughness	Sodium, Chloride, Fluoride Analysis	Microscopic Contamination Analysis-SEM	Mass Spectroscopy	NonMetallics - Tensile/Compressive	NonMetallics -Uncured Properties	NonMetallics - Flex/Short Beam	Particles Size Distribution - Laser Light Scattering		Tensile, Cryogenic	Cryogenic, Coefficient of Thermal Expansion	Humid Stress Rupture	RT and ET - Coefficient of Thermal Expansion	Thermal Conductivity - Metal	Plating Embrittlement	Totals	SQE
	Specific Test Codes / General Testing Codes	1	2	3	4	5	6	7	7-a	7-b	7-c	7-d	7-e	7-f	7-g	7-h	7-i	8	9	10	11	12	12-a	13	14	15	16	17	17-a	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35		
1	**Advanced Plastic & Material Testing** 42 Dutch Mill Road Ithaca, NY 14850	■				■		■	■										■	■		■		■		■	■			■					■		■	■	■									14	Meehan
2	**ATI Specialty Metals** Blackmore Street Sheffield S4 &TZ United Kingdom	■	■	■	■	■		■	■										■			■						■																			10	TBD
3	**ATI Wah Chang** 1600 N.E. Old Salem Road, P.O. Box 460 Albany, Oregon 97321																		■			■		■																								3	Matzke
4	**Atlas Testing Labs** 9820 6th Street Rancho Cucamonga, California 91730	■	■	■		■	■	■	■						■			■	■	■	■	■		■								■														16	Sevimli
5	**Connecticut Metallurgical Inc.** 100 Prestige Park Road East Hartford, Connecticut 06108	■	■	■	■	■		■	■	■	■	■	■	■	■	■			■	■	■	■	O&H	■		■	■								■											■	24	Facas
6	**Dickson Testing** 11126 Palmer Avenue Southgate, California 90280	■	■	■	■	■	■	■	■		■		■			■		■	■		■	■		■				■	Pb,Bi,Se,Te, Tl	Y			■														21	Ghassemi
7	**Dirats Laboratory** 41 Airport Road P.O. Box 39 Westfield, Massachusetts 01086	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			■	■	■	■		■	■			■	C-Pb,Bi,Se,Te, Tl	Y	R	■	■	■	■					■						■	32	Berube
8	**Eaton Aerospace Laboratories** 23555 Euckid Avenue Cleveland, Ohio 44117	■	■	■		■	■	■	■							■		■	■	■	■	■		■	■		■		Pb,Bi,Se,Te, Tl,Ni Base Alloys					■	■											20	Zelle
9	**Element Materials Technology** 5405 Schaaf Road Cleveland, Ohio 44131	■	■	■	■	■	■	■	■		■		■	■				■	■	■	■	■		■	■			■	Pb,Bi,Se,Te																	22	Zelle
10	**Element Materials Technology** 1857 Business Center Drive Duarte, CA 91010					■																■				■	■									■	■	■									5	Sevimli
11	**Element Materials Technology** 15062 Bolsa Chica Huntington Beach, California 92649	■	■	■	■	■	■	■	■		■	■	■	■	■			■	■	■	■	■		■				■		■		■	■													25	Ghassemi
12	**Element Materials Technology** 2 Pheasant Run Newtown, Pennsylvania 18940	■	■	■		■	■	■	■	■	■	■	■	■	■	■			■	■	■	■		■								■													■	22	McCallister
13	**Element Materials Technology** 3200 S. 166th Street New Berlin, Wisconsin 53151-2701	■				■		■	■									■	■			■		■																						8	Works
14	**Element Materials Technology** 3701 Port Union Road Fairfield, Ohio 45014					■		■			■		■	■																	■	■														7	Farmer

P&W - MCL - Qualified Commercial Laboratory - Table I

Yellow highlighted fields represent correlation testing per MCLM F23.

Light blue highlighted fields represent labs found capable to perform this type of test.

Light green highlighted fields with letters represent specific test recognitions.

	Commercial Laboratories	Tensile, Room Temperature	Tensile, Elevated Temperature	Stress Rupture	Creep Rupture	Hardness	Impact	Metallographic Examination - All Others (See Note 10)	ME - Microstructure/Grainsize (See Note 10)	ME - Abusive Machining E166 Supp A (See Note 10)	ME - Surface Contamination of Titanium (See Note 10)	ME - Braze (See Note 10)	ME - Weld (See Note 10)	ME - Nonconventional Machining, ECMR, EDMR, LBMR, EBMR (See Note 10)	ME - Fasteners (See Note 10)	ME - Heat Treat (See Note 10)	ME - Coatings (Vapor/Pack/Thermal) (Commercial Labs by Exception Only) (See Note 10)	Wet Chemical Analysis (See Note 2)	OES Quantitative Spectrographic Analysis (See Notes 3, 4, & 5)	Salt Spray	Heat Treating (to condition lab specimens)	Gas Analysis - Combustion (C, S)	Gas Analysis - Inert Gas Fusion (O-Oxygen, N-Nitrogen, H-Hydrogen	Semi-quantitative Analysis (See Note 1)	Sieve Analysis	Plastics (See Note 8)	Rubber Materials including Polymers (See Note 8)	Atomic Absorption (See Notes 5 & 6)	AA - Tramp Elements (See Notes 5 & 6)	XRF Quantitative Spectrographic Analysis - All Others (See Notes 4 & 5)	XRD (See Note 7)	Fatigue	Fracture Toughness	Sodium, Chloride, Fluoride Analysis	Microscopic Contamination Analysis-SEM	Mass Spectroscopy	NonMetallics - Tensile/Compressive	NonMetallics -Uncured Properties	NonMetallics - Flex/Short Beam	Particles Size Distribution - Laser Light Scattering		Tensile, Cryogenic	Cryogenic, Coefficient of Thermal Expansion	Humid Stress Rupture	RT and ET - Coefficient of Thermal Expansion	Thermal Conductivity - Metal	Plating Embrittlement	Totals	SQE
	Specific Test Codes / General Testing Codes	1	2	3	4	5	6	7	7-a	7-b	7-c	7-d	7-e	7-f	7-g	7-h	7-i	8	9	10	11	12	12-a	13	14	15	16	17	17-a	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35		
15	**Element Materials Technology** 9301 Innovation Drive Suite 175 Daleville, IN 47334-0569																												Pb,Bi,Se,Te, Tl																				22	Simos
16	**Element Materials Technology** 1200 Westinghouse Blvd., Suite A Charlotte, NC 28273-6313																																														4	TBD
17	**Exova Inc. - Freeman** 10005 Freeman Avenue Santa Fe, Springs, California 90670																												Pb,Bi,Se,Te, Tl																				18	Cook
18	**Exova Inc. - Glendale Heights Lab** 194 International Blvd Glendale Heights, Illinois 60139																																														21	Works
19	**Exova Mexico** Carretera Monterrey-Saltillo #3279-B Col: Privade de Santa Catarina Santa Catarina, Nuevo Leon, Mexico																																														6	Griffin
20	**Genitest Inc.** 3472 Frontenac Montréal, Québec H2K 3A5																																														1	Lu
21	**Hill Engineering** 3035 Prospect Park Drive, Suite 180 Rancho Cordova, CA 95670																														S																	1	Matzke
22	**IMR KHA - Portland** 5687 S. E. International Way, Ste. A Portland, Oregon 97222																																														13	Matze
23	**IMR Metallurgical Services** 4510 Robards Lane, Louisville, KY 40218																																														1	Farmer
24	**IMR Singapore Pte. Ltd.** 30 Loyang Way #03-16 Singapore 508769																																														15	Na
25	**IMR Test Labs** 131 Woodsedge Drive Lansing, New York 14882																																														31	Meehan
26	**IncoTest** Homer Road Hereford, HR4 9SL United Kingdom																																														15	TBD
27	**Joliet Metallurgical Laboratories** 305 North Republic Avenue Joliet, Illinois 60435																																														5	Works
28	**Laboratory Testing Inc.** 2331 Topaz Drive Hatfield, Pennsylvania 19440																																														22	McCallister

P&W - MCL - Qualified Commercial Laboratory - Table I

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	Specific Test Codes / General Testing Codes	1	2	3	4	5	6	7	7-a	7-b	7-c	7-d	7-e	7-f	7-g	7-h	7-i	8	9	10	11	12	12-a	13	14	15	16	17	17-a	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35		
29	**Lehigh Testing Laboratory** 308 West Basin Road P.O. Box 903 New Castle, Delaware 19720	■				■	■										■		■			■		■																							6	McCallister
30	**Luvak Inc.** P.O. Box 597 Boylston, Massachusetts 01505-597																■	■	■			■	■	■				■	Pb,Bi,Te,Tl																		7	Berube
31	**Martin Metallurgical** Stuart, FL					■											■																															1	Valery
32	**Massachusetts Materials Research, Inc.** 1500 Century Drive West Boylston, Massachusetts 01583	■				■	■	■	■		■	■	■	■			■	■	■			■	■	■																			■					15	Berube
33	**Metals Technology Inc.** 19801 Nordoff Street Northridge, California 91324	■	■	■	■	■	■	■	■		■				■	■	■	■	■		■	■	■	■				■	Pb,Bi Wrought Alloys Only			■										■						22	Duffy
34	**Northern Analytical Laboratory** 23 Depot Street Merrimack, NH 03054																■																		■												1	Okawa
35	**NSL Analytical Services Inc.** 4450 Cranwood Parkway Cleveland, Ohio 44128																■	■	■			■		■				■	Se,Te	■																		7	Zelle
36	**NSL Metallurgical** 4535 Renaissance Pkway Cleveland, OH 44128	■	■	■		■	■	■							■	■	■		■		■			■																							11	Zelle
37	**Omega Research Inc.** 15843 Guy James Road Justin, Texas 76247					■											■			■																												3	Griffin
38	**RTM Breda S.r.l.** Via Biancge 18 Carre' (VI) Italy 36010	■	■	■		■	■	■	■								■		■																												8	Raban
39	**Singapore Test Services PTE Ltd.** 249 Jalan Boon Lay Jurong Town, Singapore 619523							■		■		■		■			■	■	■	■				■				■																			9	Korenkiewicz
40	**Southern Research Institute** 757 Tom Martin Drive Birmingham, Alabama 35211																■																										■		■	■			3	Lawrence
41	**Timet UK Ltd** P.O. Box 704, Witton Birmingham B6 &UR United Kingdom	■	■	■		■		■			■						■	■	■		■	■	■	■				■		■			■														15	TBD
42	**UL Verification Services Inc.** 1559 King St. Enfield, CT 06082																■									■	■										■	■										4	Chang
43	**Westmoreland Mechanical Testing & Research Inc** P.O. Box 388 Youngstown, Pennsylvania 15696	■	■	■	■	■	■	■	■					■			■		■		■	■		■				■				■	■														16	Zelle

P&W - MCL - Qualified Commercial Laboratory - Table I

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Specific Test Codes / General Testing Codes	1	2	3	4	5	6	7	7-a	7-b	7-c	7-d	7-e	7-f	7-g	7-h	7-i	8	9	10	11	12	12-a	13	14	15	16	17	17-a	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35		
Totals	29	24	24	15	30	19	27	23	7	16	10	13	16	9	10	0	16	30	13	20	26	19	26	4	5	6	15	10	12	3	10	10	4	5	1	5	4	3	2	0	2	1	1	2	1	4	532	

Notes:

1. P&W defines semi-quantitative spectrographic analysis as "The Determination of a material's chemistry to detect the presence of the alloying elements to a degree by which a positive identification can be made as to the alloy type, as well as the ability to distinguish between similar alloys".
2. P&W defines wet chemical analysis as "gravimetric or titrametric analysis".
3. ICP, DCP, Direct Reader.
4. P&W defines quantitative analysis as "utilization of a least squares calibration curve".
5. Code numbers with an element suffix (e.g.; 17Pb) designate qualification for analysis of that element on cast turbine airfoil alloys by the specified test method.
6. The letter "C" suffix to Code 17 (Atomic Absorption) also designates qualification for residual cerrobend analysis in hollow core blades and vanes.
7. The letter "R" suffix to Code 19 (XRD) also designates qualification for retained austenite. Letter "S" to Code 19 (XRD) designates qualification for residual stress analysis
8. Qualification for Codes 15 and 16 is not required for simple identification tests such as those listed in MCL Manual Section S-8.
9. The letter "A" suffix to Code 29 (yttrium analysis) indicates the ICP method. The letter "B" suffix to Code 29 (yttrium analysis) indicates the DCP method.
10. Code 7 does not include metallographic examination of thermal spray coatings, pack process diffusion coatings, plasma or vapor deposition coatings at qualified commercial laboratories.

PWC - MCL - Qualified Commercial Laboratory - Table II

Light blue highlighted fields represent labs found capable to perform this type of test.

Light green highlighted fields with letters represent specific test recognitions.

	Commercial Laboratories	Tensile, Room Temperature	Tensile, Elevated Temperature	Stress Rupture	Creep Rupture	Hardness	Impact	Metallographic Examination	Chemical Analysis (See Note 2)	Spectrographic Analysis (Quantitative) (See Notes 3, 4, & 5)	Salt Spray	Heat Treating (to condition lab specimens)	Gas Analysis	Spectrometric Analysis (semi-quantitative, as defined below)	Sieve Analysis	Plastics (See Note 8)	Rubber Materials including Polymers (See Note 8)	Atomic Absorption (See Notes 5 & 6)	XRF (See Notes 4 & 5)	XRD (See Note 7)	Low Cycle Fatigue	Fracture Toughness	Sodium, Chloride, Fluoride Analysis	Microscopic Contamination Analysis	Particles Size Distribution - Laser Light Scattering	EDAX Analysis on S.E.M.	Fuel Analysis (See Note 9)	Hardenability on Disc & Jominy (See Note 9)	Flash Point Testing (See Note 9)	Totals	SQE
Specific Test Codes / General Testing Codes		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	28	29	C30	C31	C32		
1	**Acuren Group Inc.** 2412 Drew Road Mississauga, Ontario, L5S 1A1	■				■	■	■	■		■																			6	Bale
2	**Allvac Ltd. - Commercial Testing Services Ltd.** Blackmore Street Sheffield, United Kingdom, S4 7TZ	■	■	■	■	■		■																						6	Jones
3	**Allvac Ltd.** Atlas House, Attercliffe Rd. Sheffield, United Kingdom S4 7UY								■	■			■					■												4	Jones
4	**CETIM** Etablissement de Nantes 74, route de la Jonalière B.P. 82617 44326 Nantes Cedex 3 France								■	■								■												3	Jones
5	**Engineering Material Research** 35 Carl Hall Road, Unit 3 Downsview, Ontario, M3K 2B6 CANADA	■	■																		■									3	Bale
6	**Exova Burlington** 1440 Graham's Lane Unit 11 Burlington, Ontario L7S 1W3								■	■																				2	Bale
7	**Exova Cambridge** 15 Highridge Court Cambridge, Ontario, N1R 7L3	■				■		■						■																4	Bale
8	**Exova Mississauga** 2395 Speakman Drive Mississauga, Ontario L5K 1B3, CANADA	■	■																		■									3	Bale
9	**Exova Plzen** Podnikatelska 39Plzen 301 00 Czech Republic	■	■	■		■							■																	5	Jones
10	**Exova Pointe-Claire** 121 boul. Hymus Pointe-Claire, Québec, H9R 1E6	■				■	■	■	■		■			■												■				8	Lobo
11	**Exova Teesside** Holwick Road Middlesbrough, Cleveland TS2 1QS United Kingdom								■	■			■																	3	Jones
12	**Exova (UK) Ltd.** 182 Halesowen Road Netherton, Dudley DY2 9PL United Kingdom							■																						1	Jones

PWC - MCL - Qualified Commercial Laboratory - Table II

Light blue highlighted fields represent labs found capable to perform this type of test.

Light green highlighted fields with letters represent specific test recognitions.

	Commercial Laboratories	Tensile, Room Temperature	Tensile, Elevated Temperature	Stress Rupture	Creep Rupture	Hardness	Impact	Metallographic Examination	Chemical Analysis (See Note 2)	Spectrographic Analysis (Quantitative) (See Notes 3, 4, & 5)	Salt Spray	Heat Treating (to condition lab specimens)	Gas Analysis	Spectrometric Analysis (semi-quantitative, as defined below)	Sieve Analysis	Plastics (See Note 8)	Rubber Materials including Polymers (See Note 8)	Atomic Absorption (See Notes 5 & 6)	XRF (See Notes 4 & 5)	XRD (See Note 7)	Low Cycle Fatigue	Fracture Toughness	Sodium, Chloride, Fluoride Analysis	Microscopic Contamination Analysis	Particles Size Distribution - Laser Light Scattering	EDAX Analysis on S.E.M.	Fuel Analysis (See Note 9)	Hardenability on Disc & Jominy (See Note 9)	Flash Point Testing (See Note 9)	Totals	SQE
	Specific Test Codes / General Testing Codes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	28	29	C30	C31	C32		
13	**Genitest Inc.** 3472 Frontenac Montréal, Québec. H2K 3A5																													10	Lu
14	**Inspectorate - A Bureau Veritas Group Company** 9756 Notre-Dame Est Montréal, Québec H1L 3R4																													1	Caron
15	**Metcut Research Inc.** 3980 Rosslyn Drive Cincinnati, OH, USA 45209-9511																													4	Mackenzie
16	**Mitchell Aerospace Inc.** 350 Décarie Ville St-Laurent, Québec, H4L 3K1																													4	Lu
17	**Pratt & Whitney Canada Corp. Plant 1 "Chemical Technology & Test" Department** 1000 Marie Victorin Longueuil, Quebec J4G 1A1																													7	Halle
18	**R&D Laboratory for Aerospace Materials Rzeszow University of Technology** Ul. W.Pola 2 Rzeszow, Poland 35-959																													6	Skoczylas
19	**Sandvik Osprey Ltd Red Jacket Works, Neath** SA11 1NJ South Wales United Kingdom																													3	Jones
20	**SGS Canada Inc. – Industrial Services** 3420 St-Joseph Blvd East Montréal, Québec H1X 1W6																													1	Caron
21	**SGS Canada** 11000-A Sherbrooke E. Montréal, Québec, H1B 5W1																													2	Caron
22	**Team Industrial Services TCM Division** 105 Chester Road Woodlawn, Cincinnati OH 45215																													2	Mackenzie
23	**Timet UK Ltd.** P.O. Box 704 Witton, Birmingham B6 7UR England																													1	Jones
24	**Vac Aero Kalisz** 62-800 Kalisz / Poland ul. Elektryczna 8																													3	Skoczylas

PWC - MCL - Qualified Commercial Laboratory - Table II

Light blue highlighted fields represent labs found capable to perform this type of test.

Light green highlighted fields with letters represent specific test recognitions.

	Commercial Laboratories	Tensile, Room Temperature	Tensile, Elevated Temperature	Stress Rupture	Creep Rupture	Hardness	Impact	Metallographic Examination	Chemical Analysis (See Note 2)	Spectrographic Analysis (Quantitative) (See Notes 3, 4, & 5)	Salt Spray	Heat Treating (to condition lab specimens)	Gas Analysis	Spectrometric Analysis (semi-quantitative, as defined below)	Sieve Analysis	Plastics (See Note 8)	Rubber Materials including Polymers (See Note 8)	Atomic Absorption (See Notes 5 & 6)	XRF (See Notes 4 & 5)	XRD (See Note 7)	Low Cycle Fatigue	Fracture Toughness	Sodium, Chloride, Fluoride Analysis	Microscopic Contamination Analysis	Particles Size Distribution - Laser Light Scattering	EDAX Analysis on S.E.M.	Fuel Analysis (See Note 9)	Hardenability on Disc & Jominy (See Note 9)	Flash Point Testing (See Note 9)	Totals	SQE
	Specific Test Codes / General Testing Codes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	28	29	C30	C31	C32		
25	**WSK/ PZL- Kalisz** 62-800 Kalisz,, St.Czestowchowska, 140, Poland																													3	**Skoczylas**
26	**WSK "PZL-Rzeszow" S.A.** Hetmanska 120 35-78 Rzeszow Poland																													8	**Skoczylas**
	Totals	12	8	4	2	12	2	11	9	9	4	2	4	4	0	0	0	4	2	0	4	1	0	0	2	3	2	1	1	103	

Notes:

1. P&W defines semi-quantitative spectrographic analysis as "The Determination of a material's chemistry to detect the presence of the alloying elements to a degree by which a positive identification can be made as to the alloy type, as well as the ability to distinguish between similar alloys".
2. P&W defines wet chemical analysis as "gravimetric or titrametric analysis".
3. ICP, DCP, Direct Reader.
4. P&W defines quantitative analysis as "utilization of a least squares calibration curve".
5. Code numbers with an element suffix (e.g.; 17Pb) designate qualification for analysis of that element on cast turbine airfoil alloys by the specified test method.
6. The letter "C" suffix to Code 17 (Atomic Absorption) also designates qualification for residual cerrobend analysis in hollow core blades and vanes.
7. The letter "R" suffix to Code 19 (XRD) also designates qualification for retained austenite. Letter "S" to Code 19 (XRD) designates qualification for residual stress analysis
8. Qualification for Codes 15 and 16 is not required for simple identification tests.
9. Codes C30, C31 and C32 are formerly PWC Codes 30, 31, and 32, respectively

*** * * End of Document * * ***