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FASTENER RECESS EVALUATION

ENGBERT/BANNINK  
GERALD/BOWMAN  
FORREST/SANDOW

ADVANCED STRUCTURES DEVELOPMENT BRANCH  
STRUCTURAL MECHANICS DIVISION

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TECHNICAL REPORT AFFDL-TR-78-22

Final Report for Period June 1976 - October 1977

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This technical report has been reviewed and is approved for publication.



FORREST SANDOW  
Project Engineer

FOR THE COMMANDER



RALPH L. KUSTER, JR. Colonel, USAF  
Chief, Structural Mechanics Division

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report presents the results of a series of tests performed to establish the strengths and weaknesses of various recesses used in fasteners. Effects of torque, end load, paint, removal angle, hardness of bit, wear of bit, size of bit and damage to recess were studied. Data was taken both under ideal conditions in the laboratory and at various Air Force Bases around the country.		

FOREWORD

This effort was part of a larger effort undertaken by the Aeronautical Systems Division (ASD/EN) to identify and resolve root causes of the complaints received from the field on aircraft structural fasteners. ASD enlisted the aid of the Air Force Flight Dynamics Laboratory (AFFDL) and the Air Force Materials Laboratory (AFML) to perform certain experimental and analytical tasks. The Productivity, Reliability, Availability, and Maintainability (PRAM) Program Office (ASD/RA) provided most of the equipment funding required for these tasks. ASD/EN retained the task of reviewing the standards and specifications applicable to the procurement and use of the panel fasteners and those pertaining to the mating tools.

This report explains the laboratory tests performed in the AFFDL Advanced Structures Development Branch on the various types of recesses, discusses the results, covers the field data collection task, and what was learned from that effort. The work covered the time period of June 1976 through October 1977 and was performed under Project No. 7500, Task No. 750001, and Work Unit 75000191.

Many people from the laboratories and other organizations provided assistance toward the successful completion of these tasks. Several dozen people were contacted and provided assistance in the field; their cooperation was enthusiastic, and their assistance is much appreciated.

We would like to single out Mr. David Erskine, of the Structures Test Facility (AFFDL/FBT), for his assistance in setting up the instrumentation; Mr. Don McWhirter (AFFDL/FBSC), for fabricating the laboratory test equipment and Lt. Ken Bauman (ASD/ENF), for his assistance in obtaining the field data and some of the test hardware. Messrs. Bob Urzi (AFMS) and Richard Stewart (ASD/ENF) supplied the answers to our many questions on fasteners and associated military and NAS standards and specifications.

FOREWORD (CONTINUED)

We would also like to thank the following companies for supplying stock screws and bits to help our initial investigations.

General Services Administration, National Tool Center

Apex Machine and Tool Co.

Phillips International Co.

Hi-Shear Corp.

General Dynamics Corp.

Defense Logistics Agency, Defense Industrial Supply Center

P. B. Fasteners

Deutsch Fastener Corp.

Special thanks must be given to the Boeing Commercial Aircraft Company for the loan of their test machine to start off our program.

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GLOSSARY OF TERMINOLOGY

Cam-Out - The application of torque to a recess until a complete disengagement occurs between the bit and the recess. This torque application usually damages the recess, the bit, or both, depending on the type of recess, end load, etc.

End Load - The force with which the bit is pressed into the recess while removal or installation torque is applied.

Freezing - When a fastener is installed and cannot be removed with conventional tools and bits.

Off-Angle - The angular offset or misalignment between the axis of the screw and the axis of the bit.

Shear Head - A fastener with a smaller than "normal" head which is used where shear forces are predominate. In usual practice the head is the same as the head of the next smaller shaft diameter tension head fastener.

Tension Head - The "normal" dimensioned head size which is used where both shear and tension forces can cause failures.

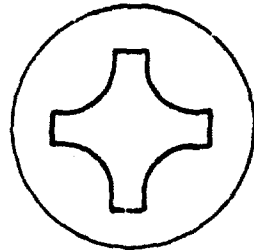
## SECTION I

## INTRODUCTION

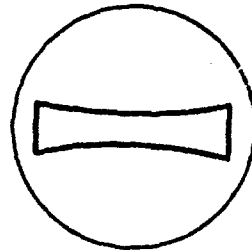
Over the years, many complaints have been received by Aeronautical Systems Division (ASD) on the service failure of fastener internal wrenching systems (or recesses as they will be referred to in this report). A synopsis of the problem showed that the Hi-Torque recess was singled out as receiving the majority of the complaints; the reported failures concentrated on the smaller size fasteners (3/16 - 5/16 in.) installed in frequently removed panels. The failures usually occurred when removal of the screws was attempted with a speed wrench.

Personal experience of one of the authors, as an aircraft maintenance officer, in general agrees with the above synopsis. The failures appeared to be concentrated on the smaller screw sizes with the 3/16 in. shear head screws being the most susceptible. The reason failures are reported on removal is that it requires a machinist to take the screw out and complete job order paperwork. Installation failures usually occur before the screw is completely seated when it can still be removed and replaced by the airplane mechanic. Failures were also experienced on other types of recesses, but the Hi-Torque recess did appear to be very susceptible to being rounded (or "cammed") out.

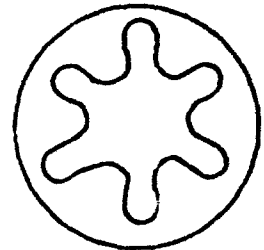
Various factors were initially identified as having an impact on the problem, from the causes of high removal torque to low recess torque capability and from tool quality and choice to human factors. However, there is yet another and very basic problem; there is no standard test method to realistically evaluate recess performance. This report describes a series of tests that were performed on five recess designs; Phillips, Hi-Torque, Torq-Set, Tri-Wing and Torx as shown in Figure 1. The test was broken down into laboratory test and a field data survey. The laboratory testing was broken down into three basic phases. In the first phase, a series of preliminary tests were performed to establish a test method and isolate important parameters. Only the more significant results of this testing are referred to in this report. The second phase, the main test program, which is analyzed in this report, is outlined in Table 1 and the complete raw data is presented in Appendix A. In the



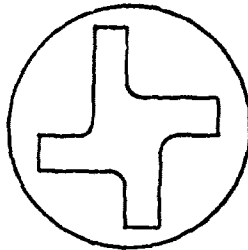
Phillips



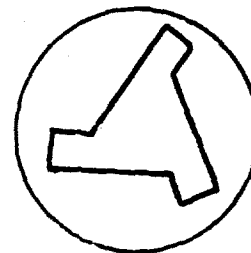
Hi-Torque



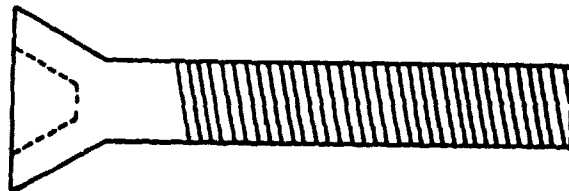
Torx



Torq-Set



Tri-Wing



Fastener Side View

Figure 1. Typical Recessed Fastener and Head Types

TABLE 1  
TEST MATRIX

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Phillips	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Hi-Torque	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Torque Set	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Tri-Wing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Torx	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Angle	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	
Size (Correct/Small)	C	C	S	C	C	S	S	C	C	S	C	S	S	C	C	S	S	C	C	S	S	C	C	S	S	C	C	S	S	C	C	S
Hardness (Hard/Soft)	H	H	H	S	S	S	S	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	
Bit Condition (New/Worn)	N	N	N	N	N	N	N	W	W	W	W	W	W	W	W	W	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
Paint (Yes/No)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	

final phase a small sample of stock screws, different materials, and ribbed screws were tested. The results of the field data survey are analyzed in the report and all the raw data is given in Appendix B. The data shows that performance differences can be detected in the various recess designs and the results also confirmed the preferences of mechanics in the field.

The title of the program is somewhat a misnomer since it was really the combination (or system) of recesses and bits that was tested. Bit failures are at least as frustrating in the field as recess failures and when a batch of poor or marginal bits finds its way into the supply system, and this does happen, they are used more quickly and shortages develop. This forces mechanics to work around the problem (filing bits, substituting the wrong size, using worn bits, etc.).

## SECTION II

## TEST EQUIPMENT

Two pieces of test equipment were used in the in-house testing phase of the program; neither machine is commercially available. The first machine applied pure torque through a shaft to the test bit and recess. A helical gear mounted on the shaft was driven by a worm gear; the force producing the torque was reacted through bearings in which the shaft was mounted. The torque was reacted by a box pinned at all four corners which allowed end load or thrust to be applied independent of the torque being applied. The test screw was mounted in a chuck on top of the torque box. The thrust initially was applied hydraulically; however, it was found that this system applied a possibly significant damping force to an incipient cam-out. A mechanical system was substituted which applied the end load with a dead weight acting through a cable, pulley, bell crank, and pushrod system. The actual end load was measured with a load cell at the fastener head, prior to torque application.

The pure torque system as described above and pictured in Figure 2 was abandoned early in the program because the data obtained with it was not comparable with the data being obtained through a hand held speed handle instrumented for torque and end load. For example, the pure torque system would consistently break new Phillips bits with new screws at a very low load (± one pound). The bit would actually lock into the recess after torque was applied and it was difficult to separate the bit from the recess under this condition. In other words, metal to metal starting friction (under localized, heavy load) would have to be overcome for the bit to cam or slide out of the recess. Due to flexibility in the speed handle and the slightest unsteadiness of the operator, this condition is not encountered with a hand driven speed handle.

Another factor that may enter into the different torque capabilities observed is that a speed handle does not just apply torque to the recess. The torque is applied through a level by a force. The recess must react the force (sideload) in addition to the torque.



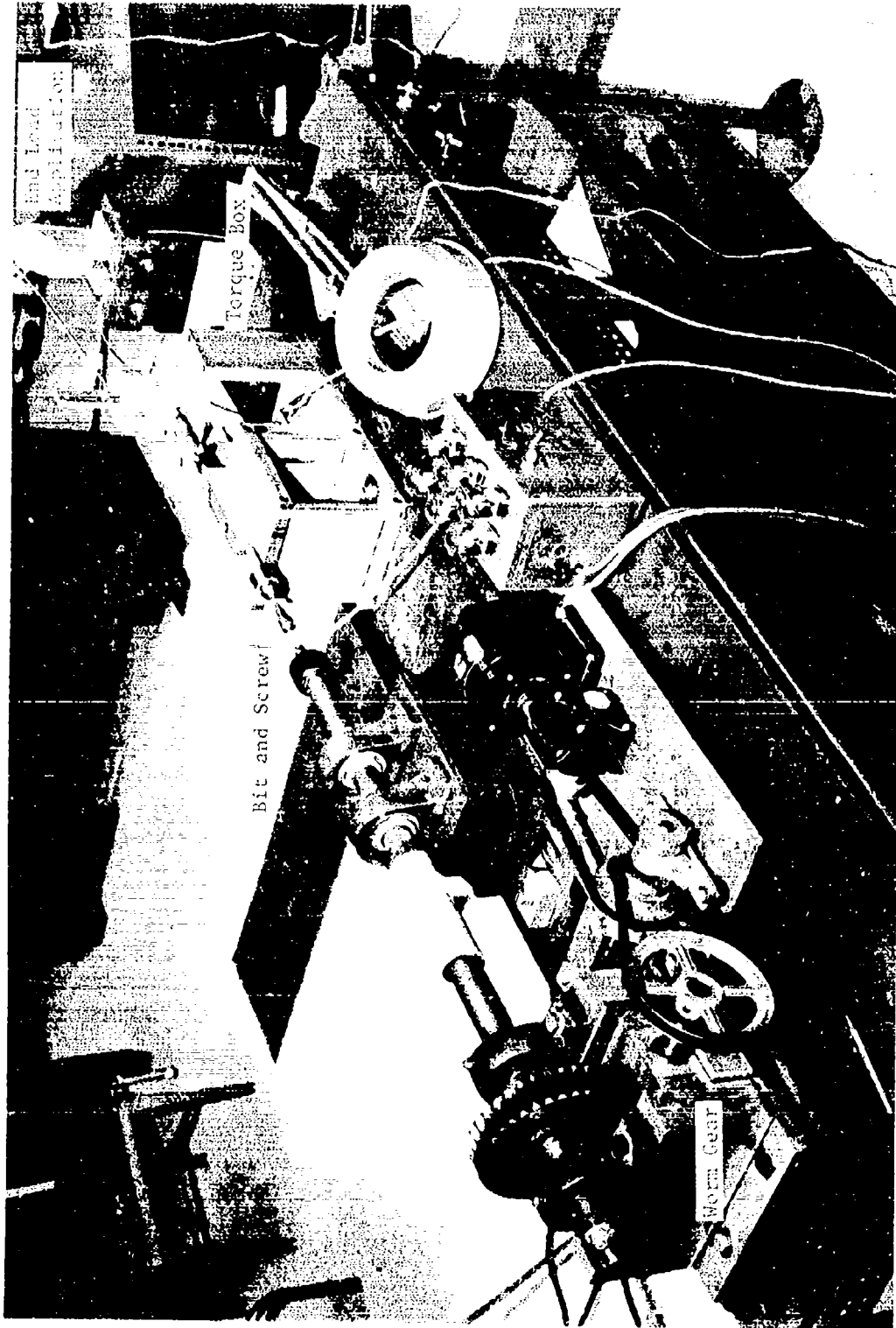


Figure 2. Boeing Test Machine

This sideload tends to force the bit out of any recess with a sloping side. See Figures 3 and 4. The side load was reacted by the shaft bearings in the first test equipment. This is not to say that a sloping side recess is bad; other factors also enter into the picture as described later in the report. No attempt was made to further define this possible effect mathematically since no noticeable difference was observed between the torque capability of a hand held speed handle versus a hand held T-handle (Figure 5). It was assumed that the flexibility of the speed handle and the unsteadiness of the operator was mostly responsible to the observed difference in the failure modes.

Therefore, in an attempt to match the results obtained with a hand held speed handle more closely, a new test machine was designed and built. This machine employed an off-the-shelf speed handle driven by a lead screw through a nut and connecting rod. The lead screw was turned by a reversible 1/15 hp electric motor. End load was applied by the same method as previously described. Torque was measured by a strain gaged extension on the speed handle. An electronic control box allowed torque limits to be set if clockwise and counterclockwise (CCW) cycles were desired; a cycle counter was also included. Torque was read out on a digital voltmeter calibrated to read directly in inch-pounds; an oscillograph was also included in the read out system. With the end or butt of the speed handle mounted in a rubber block, considerable flexibility was introduced in the test equipment which was not present in the previous, rigid system. A rotation point was built into the base to permit off angle testing. The results obtained with the revised test equipment were found to be comparable to those obtained with the hand held speed handle but parameters such as end load, angle, and torque could now be closely controlled with the man taken out of the loop.

Figure 6 contains a block diagram of the final test system. Figure 7 is a photograph of the system in the laboratory. Instead of a fastener, the photo shows the system with the load cell in place to calibrate end-load.

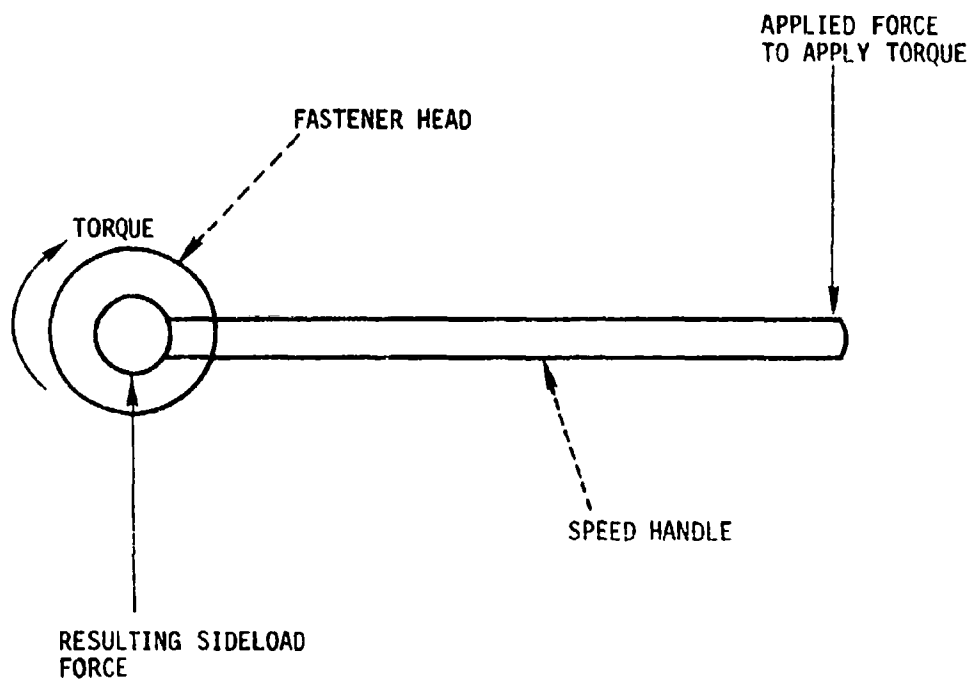


Figure 3. Generation of Sideload

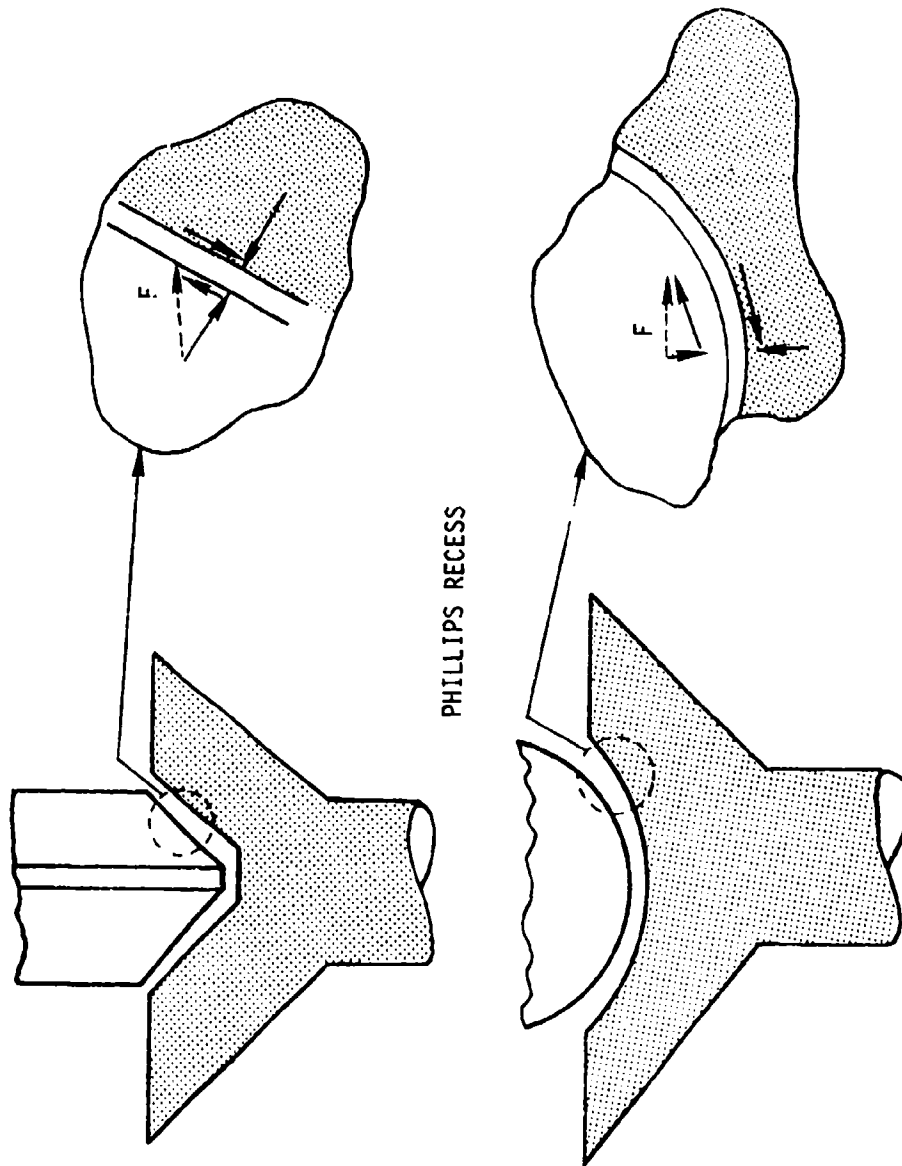


Figure 4. Phillips and Hi-Torque Sideloads

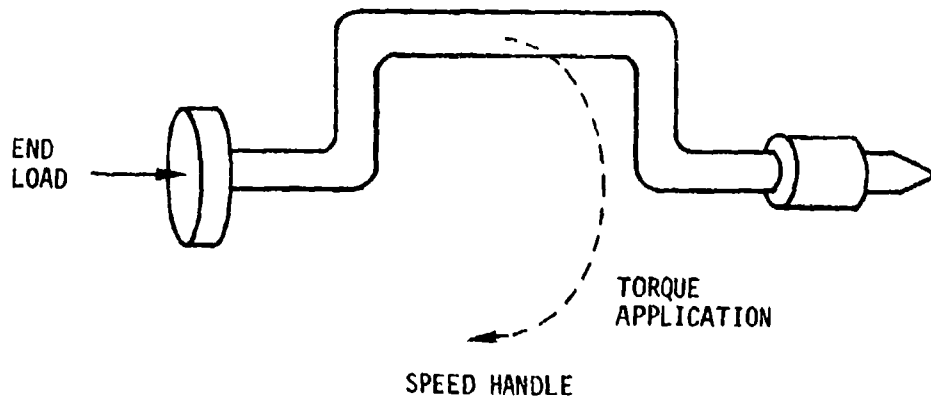
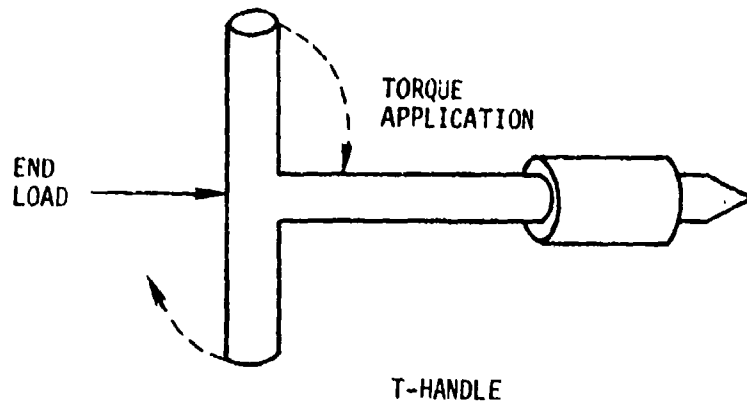


Figure 5. T-Handle and Speed Handle

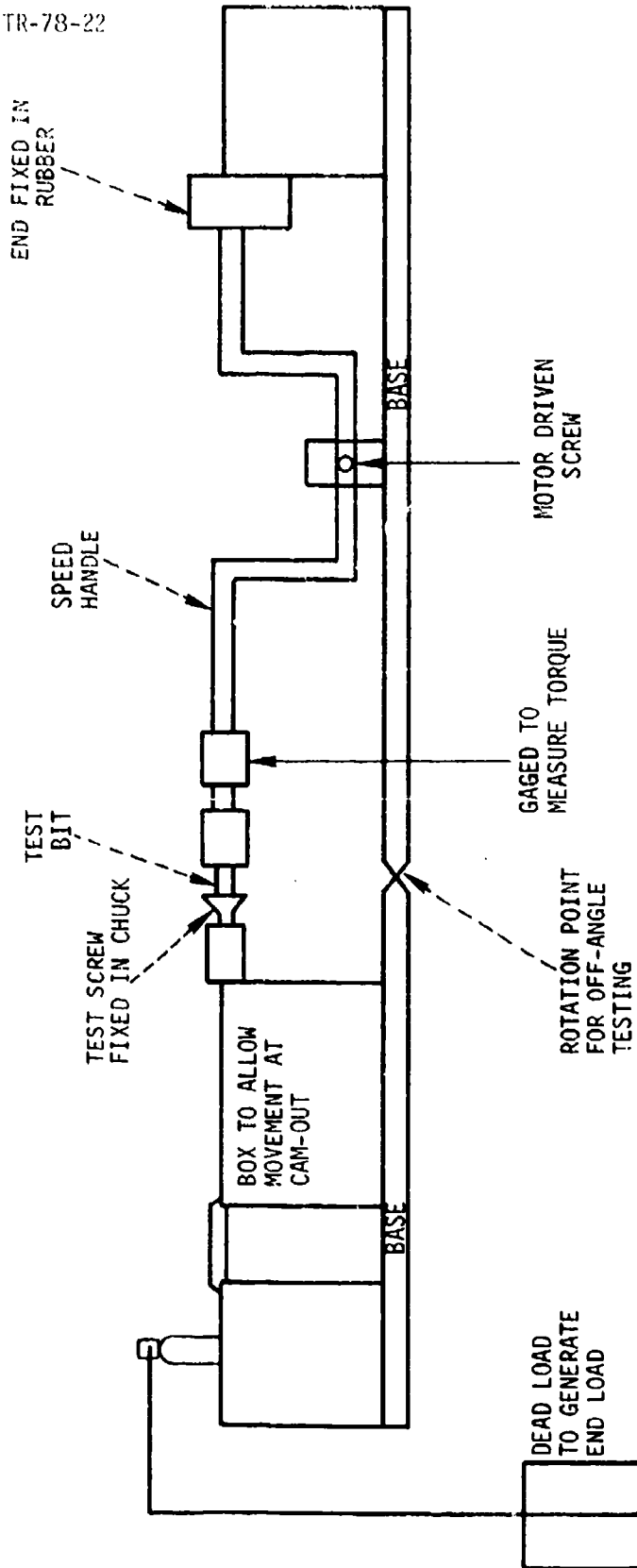


Figure 6. Fastener Test Machine

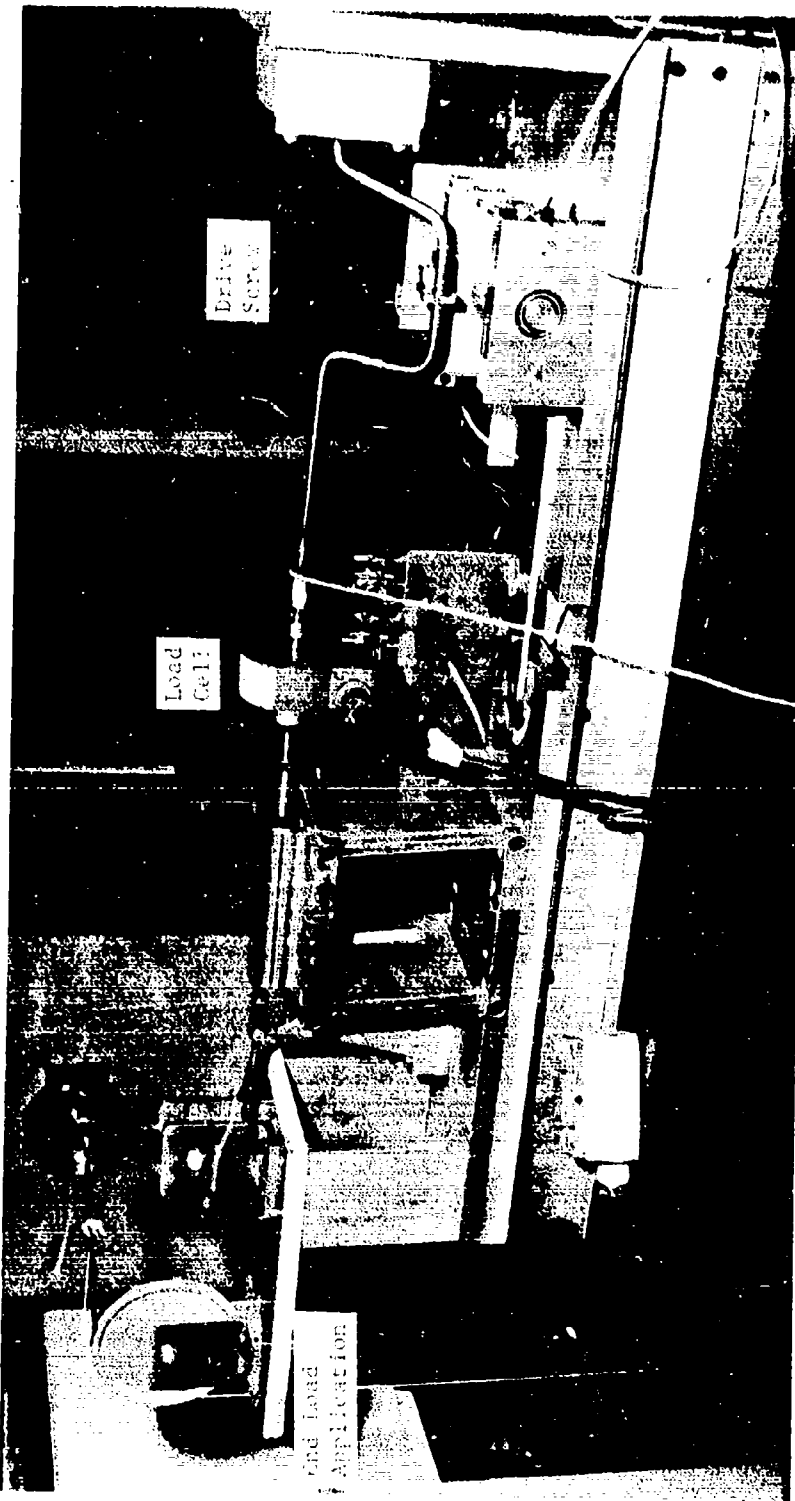


Figure 7. Final Test Machine

## SECTION III

## TEST PARAMETERS

The initial test philosophy was based on the belief that recesses failed due to gradual wear and it was planned to display the results in a series of curves similar to S/N curves but using torque levels rather than stresses vs. the number of cycles. Curves were to be run for various end loads, with and without paint in the recesses, with and without the bit at an off-set angle, with hard bits and soft bits, with undersized bits, and with worn bits. However, during preliminary tests it was discovered that gradual wear was not the predominant failure mode, at least not for recesses with sloping sides. Attempts to induce a gradual failure of the recess turned out to be much more severe on the bit than on the recess. For example, a #10 Phillips tensile head screw and mating bit were run for 2,000 cycles without a recess failure. The screw was painted, a seven degree bit offset angle was used, torque limits were set at 55 in-lbs and a 100 lb end load was used (i.e., rather severe conditions were applied). It took 30 bits to obtain the 2,000 cycles, and as a result, this approach was discarded for this program. The gradual wear failure mode is not discounted altogether. As a matter of fact, it is thought to be especially important in axisymmetric recesses such as the internal hex and Torx heads. A proposed test for this failure mode is discussed in the Recommendations Section.

From personal experience and observation during the field tests, the conclusion was drawn that many of the recess failures were not gradual but occurred rather instantaneously during the installation or removal attempt. Under some parameter or combination of parameters, the torque capability of the recess would be exceeded, the bit would cam out and the recess would be damaged to some extent. Particular care would have to be taken after the initial damage was done to keep from damaging the recess more; i.e., clean the paint out of the recess, line up the tool carefully, and apply a good end load. A preliminary test was run to duplicate this condition. The results, described below, were the basis for the new test approach. A discussion of each of the other test conditions also follows.



## 1. REPEATED CAM-OUT

Beginning with a fixed set of conditions such as a new, unpainted screw, a hard bit of the correct size and the bit straight in the recess (i.e., no offset angle) No. 2 Phillips bits and screws were repeatedly cammed-out at constant end loads. The results are plotted in Figure 8. A second test was run with two of the conditions less than ideal; the recess was painted and at the same time a seven degree offset angle was used. The results are plotted in Figure 9.

The results in these figures were consistent and thought to be quite enlightening. Previously it was not suspected that the first cam-out would be quite as damaging as it turned out to be in the laboratory test. For this particular type of recess (nonaxisymmetric) there was a discernible correlation between torque and end load at the lower end load values. The use of much higher end loads (up to 100 lbs) for the first cam-out tended to cause bit failures without increasing the maximum torque appreciably. However, as known from experience and also confirmed by later laboratory data, the use of higher end loads for damaged recesses is definitely advantageous. End loads up to 60 lbs were used in this test program for secondary cam-outs and those results confirmed that the torque-end load correlation becomes much stronger at the higher end loads with damaged recesses. Since this damage mode occurs regularly in service, it was decided to obtain the torque for the second cam-out in addition to the initial cam-out values. End loads of 10, 20, 40, and 60 lbs were used in obtaining these secondary cam-out torques. These torque values are viewed as a damage tolerance indicator and, in our opinion, should be given at least as much, if not more, importance as the figure for the initial failure.

Notice the combined effect of paint and off-angle. Both these conditions occur regularly in the field either singularly or in combination. The combination reduced the maximum torque produced by almost 50 percent as compared to the values obtained under ideal conditions.

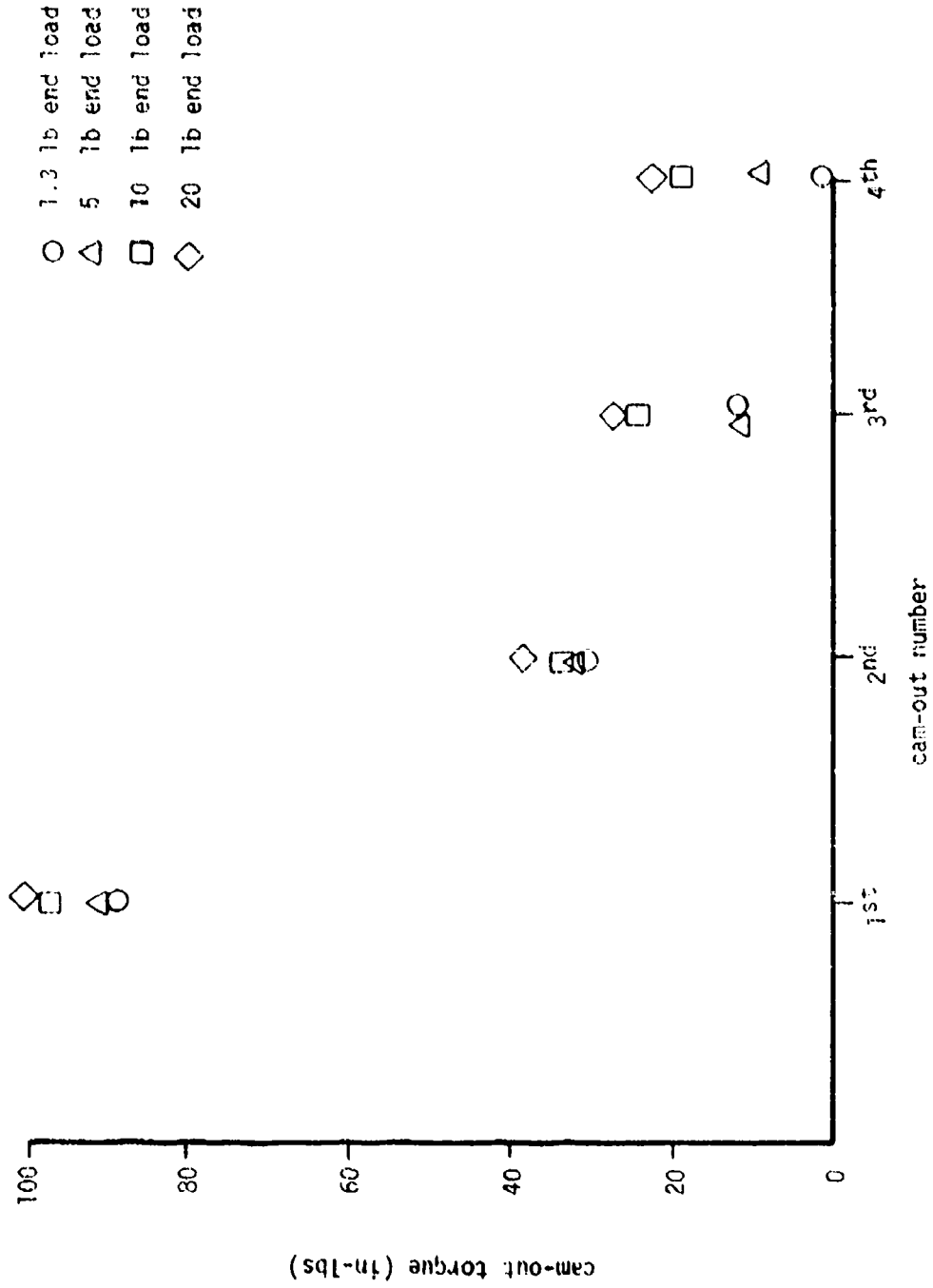


Figure 8. Repeated Cam-Out Test, Ideal Conditions

- ⊕ 1.3 lb end load
- ▲ 5 lb end load
- 10 lb end load
- ◆ 20 lb end load

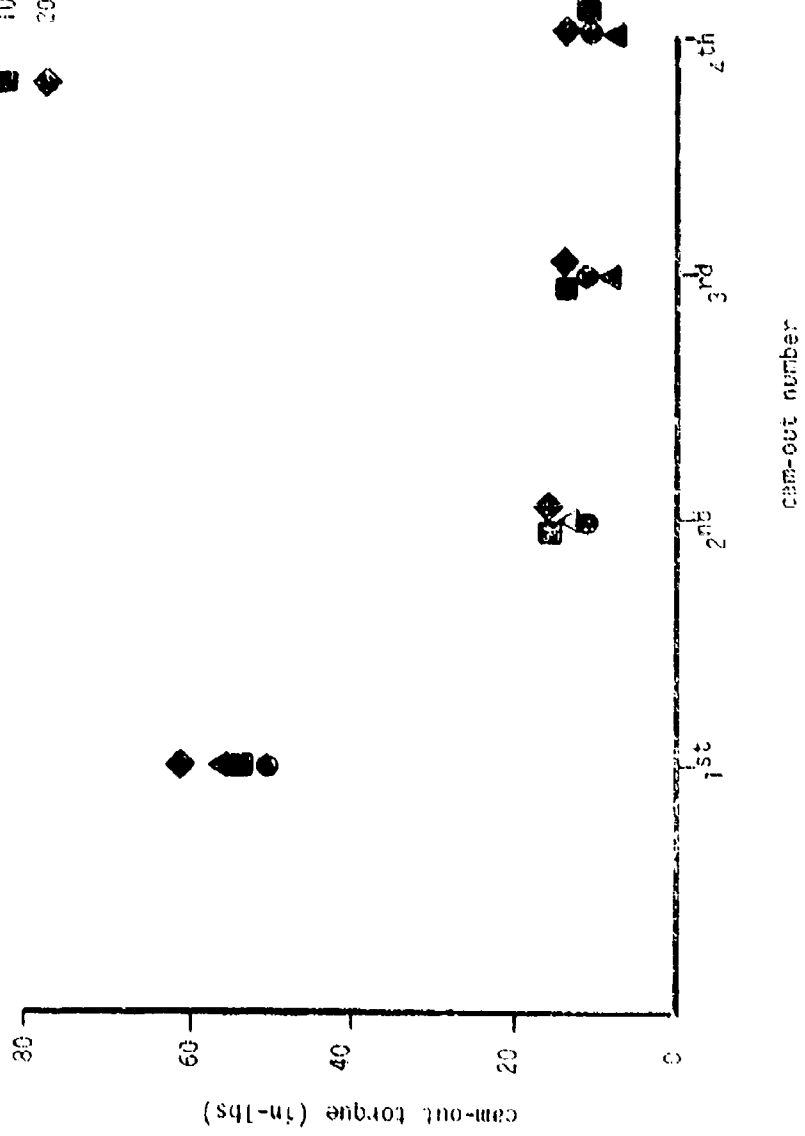


Figure 9. Repeated Cam-Out Test, Less Than Ideal Conditions

## 2. END LOAD

The end loads used for the initial cam-out were 1.3 lbs, 5 lbs, 10 lbs, and 20 lbs. There was some interest in testing at zero end load since some of the recesses to be tested were designed to be end load independent. However, the 1.3 lbs end load was the lowest attainable with the equipment (without modifications) so 1.3 lbs was used as the lowest value.

A 20 lb end load was chosen as the maximum end load for the first cam-out. Field data end load averages minus one standard deviation (using runs of over 100 data points only) varied from 14 lbs up to 34 lbs; the largest three runs (884, 449, and 231 data points) produced values of 16 lbs, 19 lbs, and 14 lbs respectively. Preliminary laboratory tests showed that for those recesses sensitive to end load the greatest rate of change of torque capability vs. end load occurred in the low range (less than 10 lbs). In addition, values of 3 to 5 lbs showed up more frequently than expected in the field data; they usually occurred when access was awkward, with small mechanics, or when little torque was expected to be necessary to remove a screw (with a series of loose screws).

Preliminary tests were also run with higher end load (30-100 lbs). For the initial cam-out the increase in torque capability with the higher end loads was not nearly as great as in the lower range. (Note: This statement is not true for subsequent cam-outs of nonaxisymmetric recesses.) The data scatter did become less and under certain conditions the high end loads forced bit failures (fracture) for one recess/bit combination. With the above findings in mind, the 5 and 10 lb end loads were chosen to explore the low range more fully.

## 3. PAINT

This condition was included in an attempt to duplicate an actual field condition. From experience it was known that the average mechanic, having to remove painted screws, would first attempt to remove the screws without cleaning out the recess. Most of the time this would work but every now and then he would cam-out a recess (and do some damage). After the damage was already done he might clean out the recess and try again.

Prior to painting, the test screws were cleaned with methyl ethyl ketone (MEK) and dried. The screws were pressed into thick cardboard (faces flush with cardboard) and the heads (and cardboard) spray painted with MIL-P-23377 primer. The primer thickness was measured by placing pieces of precision steel foil at various places on the board and measuring the primer build up with a micrometer. The primer thickness varied from 0.7 to 0.9 mils. Two coats of polyurethane paint (MIL-C-83286) were then applied which measured between 2 and 2.5 mils thickness for a total primer and paint thickness of 2.7-3.4 mils.

#### 4. OFF-ANGLE

The "off-angle" or "offset angle" refers to the angular offset or misalignment between the axis of the screw and the axis of the bit. This also was an attempt to duplicate actual field conditions. Again from experience, it was known that perfect alignment was difficult to attain or maintain in many cases and sometimes impossible to attain due to space of geometry constraints. The field data confirmed these observations and quantified them. For available sets of data, of over 100 data points each, the average maximum offset angle plus one standard deviation varied from a low of 4.8 degrees to a high of 9.1 degrees. The maximum angles in the data sets varied from 9.5 degrees to 15.5 degrees. Zero and seven degrees were the chosen values for the test.

#### 5. SOFT AND HARD BITS

Notwithstanding quality control requirements, the fact is that poor quality tools have found their way into the field and this includes soft bits and hard (brittle) bits. (See also Subsection IV-8 for a discussion on stock bits and screws for dimensional quality control). It was recognized that the recesses could not be considered by themselves but that the recesses and the mating bits should be considered as an inseparable system. The maximum torque and the number of cycles obtained can either be a recess or a bit limitation. Bits were procured in two distinctly different hardness ranges (45-48 Rockwell C scale and 60-62 Rockwell C scale) in order to assess the sensitivity of the max torque obtained to the hardness of the bit.

6. UNDERSIZED BITS

The use of undersized bits was another attempt to more nearly duplicate field conditions in this program. One of the facts of life in the field is that if a tool other than the matching tool "fits" into a recess someone, sooner or later, will use it. Judging from field observations this happens not infrequently (and many times not accidentally). Only the most obvious case of tool misuse was duplicated in this program, the case where an undersized bit is used for one type of recess, i.e., a #1 Phillips instead of a #2 or a #8 Torq-Set in place of a #10, etc. Cross utilization (a Phillips bit in a Torq-Set recess, etc.) was not duplicated even though this also occurs in this field.

7. WORN BITS

It was suspected at the start of this program that the use of worn bits had to have a significant impact on the maximum obtainable torque. Some examples of laboratory tests run with worn bits collected in the field are discussed below:

Two heavily worn #3 Hi-Torque bits tested with a new #10 tensile head screw and a 20 lb end-load produced removal torques from 22 to 47 in-lbs and installation torques from 59 to 79 in-lbs. A new bit would have produced an average of 93 in-lbs under the same conditions. A slightly worn #8 Torq-Set bit produced 82 in-lbs removal torque compared to 93 in-lbs for a new bit used on a #10 domed, shear head screw. A heavily worn #2 Phillips bit used with a new #10 tensile head screw produced only 47 in-lbs of torque compared to values up to 100 in-lbs for new bits. See Figures 10 and 11 for photographs of two of these worn bits with a side by side comparison of a new bit. These tests confirmed our suspicion that bit wear is an important parameter in the ability of the recess and bit to generate torque. These test results should be a message to the designer to specify a bit material that can be brought up to a high hardness without becoming subject to early brittle fracture. The results should also be a message to the user to change bits when wear becomes obvious.

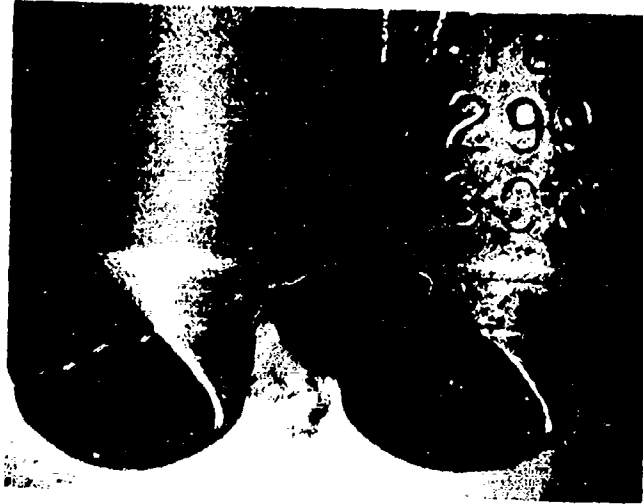


Figure 10. Worn Hi-Torque

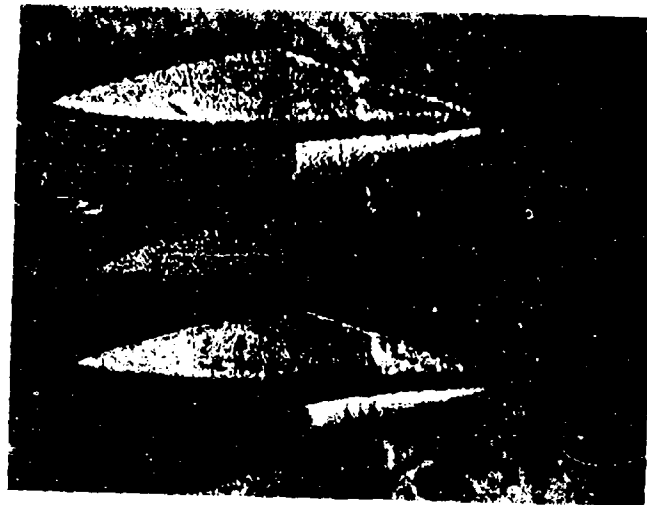


Figure 11. Worn Phillips

As the reader has observed by now, terms such as "heavy wear", "slight wear" and "obvious wear" are not very descriptive or concrete. Classifying or simulating wear did prove to be a problem in this program and was not solved to the satisfaction of the authors. When worn bits obtained in the field were examined, it was decided that it would be next to impossible to obtain uniformly worn bits from the field for the test program. The bits were not readily available in sufficient quantities, were of different designs, different manufacturers, and different materials. Even if it would be possible to grade worn bits of the same type, it would be extremely difficult to relate that wear to the wear on another type of bit. Also, if the worn bit test was ever to become part of a standard it would be very difficult and time consuming to obtain worn bits for future tests.

It was decided to attempt to wear the bits artificially instead. A 12 pound capacity rock tumbler was used. The tumbler was loaded with fifty 7/8 inch, Six-point Tumbling Stars (obtained from Keener Sand and Clay, Columbus, Ohio) along with the test bits; this load was tumbled (dry) for 150 hours. The results were only partially successful and are discussed further in Section IV.



## SECTION IV

## LABORATORY TEST RESULTS

The results of the test program do allow the engineer to differentiate between the available recess designs by analyzing the resulting numbers. However, the numbers do not tell the whole story and care must be taken when performing any statistical analysis. First of all, even though the results of the worn bit tests are reported, these numbers should be excluded from any statistical analysis. The reasons for this caution are stated in Subsection IV-7 on worn bit test results. Another item to be considered is that many bits failed on the initial cam-out and a new bit was used for the second attempt as noted on the graphs of the results. If a systems approach is taken (the recess and bit together) the second attempt should be assigned a value of zero torque. The Torx recess had a peculiar problem with broken bits in that the piece of broken bit would jam in the recess and was very difficult to remove, especially with the painted screws.

Due to the difference in test methods initially conceived and the one that actually evolved, the test matrix was not balanced and an attempt to do a full blown statistical analysis will reveal a lot of missing data. Care must be taken when obtaining averages of averages since the basic data may have unequal numbers of repeats. A full matrix was run on the Phillips recess. The initial approach foresaw a reduction of the number of test parameters to be used with the other recesses.

Comments on the results of the tests follow under test condition headings. Additional comments on recess selection can be found in Subsection VII-1.

#### 1. SECOND CAM-OUT

It was concluded early in the program that most of the recesses did not fail by fatigue or gradual wear but by repeated cam-outs. The results obtained in the laboratory fell in line with this observation. Table 2 contains an average of all the test values measured on certain

TABLE 2  
AVERAGE SECOND CAM-OUT

	BASELINE VALUES IN-LBS	7° OFF-SET TORQUE, IN-LBS	UNDERSIZED BITS TORQUE, IN-LBS	SOFT BITS TORQUE, IN-LBS	PAINTED SCREWS TORQUE, IN-LBS
PHILLIPS	54.7	17.5	30.1	0	53.3
HI-TORQUE	8.0	19.8	13.8	9.8	8.2
TORQ-SET	49.5	30.4	39.7	27.0	27.3
TRI-WING	18.5	22.9	25.3	12.5	22.4
TORX	0	37.8	8.8	0	0

second cam-out conditions. The baseline values are the torque values obtained under ideal conditions; no paint, no offset angle, and new, hard bits of the correct size.

The Phillips recess/bit conditions performed well under the ideal condition and under two of the four unfavorable conditions tested. It turned out to be quite sensitive to the 7° off-set condition and the soft bits broke or plastically deformed severely in the first cam-out, resulting in a zero value for the second cam-out. From field experience it is also known that overly hard bits will break quite readily due to the geometry of the bit.

The Hi-Torque recess turned out to be very sensitive to the first cam-out as low secondary cam-out values were obtained under the ideal and all four unfavorable conditions. In addition, due to its shallowness and rounded bottom, this recess requires great care in the torque application to prevent the tool from slipping out and damaging the recess and surrounding panel area. This is especially true if a speed handle is used and the handle happens to be aligned as shown in Figure 12. In this case the force applied to generate torque tends to pull the bit right out of the recess.

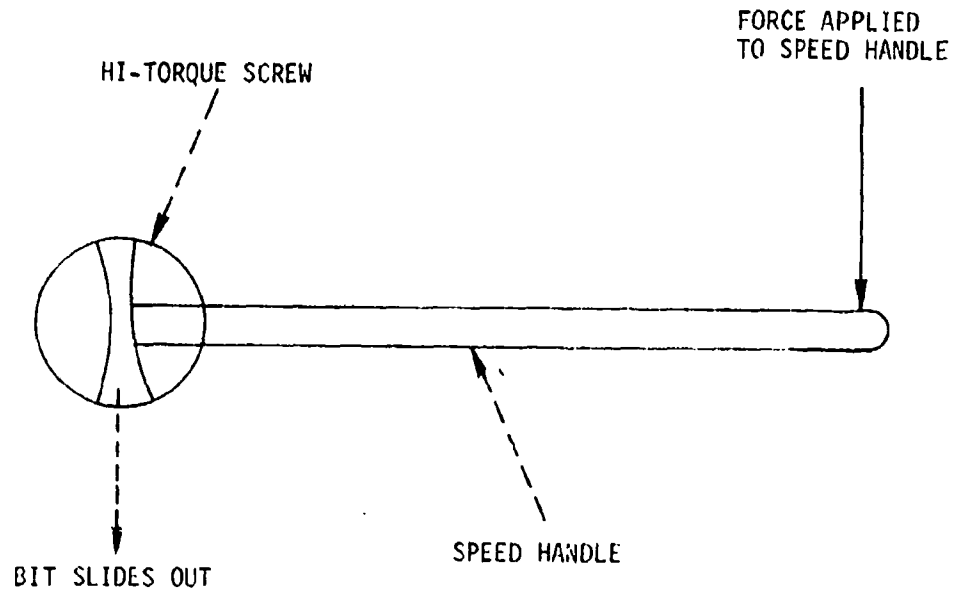


Figure 12. Speed Handle Applied to Hi-Torque Fastener

Overall, the Torq-Set recess performed very well. The recess attained either the highest or second highest torque values under the five conditions tested. A high end load is very desirable for this recess after the first cam-out. For example, with painted screws the torque value averages at 10, 20, and 60 lbs end load were 7.5, 14.0, and 60.3 in-lbs respectively.

The Tri-Wing recess performed reasonably well across the board; none of the conditions had to be zeroed out and it performed better than the Hi-Torque recess under all test conditions. A high end load also favors this recess on the second cam-out. For example, average torque values for the ideal case at 10, 20, and 60 lbs end loads were 5.3, 11.8, and 38.5 in-lbs respectively.

The Torx recess suffered most under the test methods adopted (as would any similar recess such as the internal hex). Zero values were obtained in three of the five test conditions due to bit failures on the first torque application. As stated in the Introduction and discussed elsewhere, the title of the program is somewhat of a misnomer since it was really the combination of recesses and bits that was tested. Additional comments on this subject can be found in Section VII, "Recommendations and Conclusions". From experience with internal hex recesses it is suspected that a dynamic offset test as described in the Recommendations Section would be a severe test for the Torx recess. In addition, soft bits and overly hard bits would be expected to fail with much greater frequency than Hi-Torque, Torq-Set, or Tri-Wing bits.

## 2. END LOAD

End load, of course, wound up being the prime independent variable against which torque was plotted with each of the other variables being held constant. The dependence of torque on end load was confirmed where it was anticipated although not to the degree that it was expected in some cases. Table 3 lists the torque values attained at the various end loads for the first cam-out.

TABLE 3  
TORQUE VS END LOAD

FIRST CAM-OUT END LOAD, LBS	PHILLIPS TORQUE, IN-LBS	HI-TORQUE TORQUE, IN-LBS	TORQ-SET TORQUE, IN-LBS	TRI-WING TORQUE, IN-LBS	TORX TORQUE, IN-LBS
1.3	93.5	75.3	122.0	106.0	102.7
5.0	94.0	81.7	123.3	112.3	103.7
10.0	98.5	88.3	121.3	113.0	102.7
20.0	100	93.3	124.7	117.7	103.7

The table values are again the baseline torque values obtained under the most favorable conditions (no paint, no offset, and new, hard bits of the correct size). The values are averages of four repeats with the exception of three instances with three repeats.

Table 4 lists the torque values attained for the second cam-out. The procedure for obtaining the second cam-out torques was as follows: one screw each, tested initially at 1.3, 5.0, 10.0, and 20.0 lbs end load, was next tested at 10 lbs; one screw each, initially tested at 1.3, 5.0, 10.0, and 20.0 lbs was next tested at 20 lbs, etc.; with the last four screws tested at 60 lbs end load for the second cam-out. Due to lack of samples, only Phillips screws were tested with the 40 lbs second end load.

TABLE 4  
SECOND CAM-OUT TORQUE VALUES

SECOND CAM-OUT END LOAD, LBS	PHILLIPS TORQUE, IN-LBS	HI-TORQUE TORQUE IN-LBS	TORQ-SET TORQUE, IN-LBS	TRI-WING TORQUE, IN-LBS	TORX TORQUE, IN-LBS
10	40	3	29	5	0
20	51	5	42	12	0
40	68	-	-	-	0
60	72	17	78	39	0

It can be seen from a comparison of the initial cam-out torque values (Table 3) that some correlation exists between torque and end load for three of the five recesses tested. As expected, Torx did not exhibit this dependence. Surprisingly, the dependence was the strongest for the Hi-Torque recess which, due to the shape of the recess, was expected to be less dependent upon end load as compared to some of the other recesses. The reason more dependency was expected for Phillips and Torq-Set recesses probably is because most of the field experience is with screws that are at least slightly worn. As can be seen from the second cam-out torque values, the correlation of torque and end load definitely increases with worn screws. With Phillips the torque capability almost doubled when the end load was increased from 10 to 60 lbs and with Torq-Set it more than doubled.

It can be observed from the various plots of torque vs. end load that, with few exceptions, the end load dependency remains when the bit is off-set or undersized, with the screws painted, etc. It was also observed that the greatest data scatter occurred at the 1.3 lb end load again confirming the end load sensitivity.

### 3. PAINTED SCREW TEST RESULTS

As expected, paint in the recess did have a measurable effect on the obtainable torque for four of the five major recesses tested. Baseline torque values of the first and second cam-outs are compared with the values for painted screws in Table 5 below:

TABLE 5  
PAINTED SCREWS

		PHILLIPS TORQUE, IN-LBS	HI-TORQUE TORQUE, IN-LBS	TORQ-SET TORQUE, IN-LBS	TRI-WING TORQUE, IN-LBS	TORX TORQUE, IN-LBS
No Paint	1st	96.5	84.7	122.8	112.3	103.0
	2nd	54.7	8.0	49.5	18.5	0
With Paint	1st	75.3	68.3	108.8	88.7	104.8
	2nd	53.5	8.2	27.3	22.4	0
B 1st Cam-Out		-22%	-19%	-11%	-21%	+2%
A 2nd Cam-Out		-2.5%	+2.5%	-45%	+10%	-

The baseline values (no paint) are overall averages of data taken at four end loads (1.3, 5, 10, and 20 lbs) and with new, hard bits of the correct size. The change in available torque (first cam-out) varied from a slight gain attributed to data scatter for Torx to a loss of 21% for Tri-Wing and 22% for Phillips.

With the exception of Torq-Set, paint does not appear to have much of an effect on the second cam-out torques. Why the Torq-Set is different from the others in this case is not entirely clear. The initial reaction was that the paint acted as a lubricant; however, this argument immediately raises the question of why doesn't the paint affect the Phillips and Tri-Wing recesses the same way. In addition, bare metal was usually exposed after the first cam-out leaving only paint at the bottom of the recess and flakes on the side. For the baseline case, secondary cam-out values for the Torq-Set screws at 10 lbs end load were 35, 41, 11, and 30 inch-pounds; with paint, the values were 8, 9, 3, and 10 inch-pounds. At 60 lbs end load the values were 82, 86, 68, and 75 inch-pounds compared to 76, 52, 51, and 62 inch-pounds respectively. This demonstrates that high end loads for damaged screws are even more desirable when paint is present.

No values for the second Torx cam-out are given because the Torx bits failed on the first attempt.

#### 4. OFF-ANGLE

As can be seen from the values in table 6, the seven degree offset angle significantly degrades the torque capability of the recess and bit combination in four of the five major recesses tested. The Torx recess stands out in this static test but the recommendation regarding dynamic testing in Section VII, "Recommendations" should be considered seriously. The Torq-Set recess was in a very solid second place as far as remaining torque capability is concerned.

TABLE 6  
OFF-ANGLE DATA

		PHILLIPS TORQUE, IN-LBS.	HI-TORQUE TORQUE, IN-LBS.	TORQ-SET TORQUE, IN-LBS.	TRI-WING TORQUE, IN-LBS.	TORX TORQUE, IN-LBS.
0° Angle	1st	96.5	84.7	122.8	112.3	103.0
	2nd	54.7	8.0	49.5	18.5	0
7° Angle	1st	68.3	66.0	82.3	69.3	99.4
	2nd	17.5	19.8	30.4	22.9	37.8
Δ 1st Cam-Out		-29%	-22%	-33%	-38%	-3%
Δ 2nd Cam-Out		-68%	+147.5%	-34%	+23%	-

There was no trend as far as second cam-out torque capability is concerned. It decreased for Phillips and Torq-Set but increased for Hi-Torque and Tri-Wing; the increase probably results from less damage being done to the recess during the first cam-out. In the case of the Hi-Torque recess, for example, the first cam-out under perfect conditions just about totally destroyed the recess, leaving little remaining capability for the second attempt. It is interesting to note that the 7° offset changed the failure mode for Torx from the bit to the recess.

#### 5. SOFT BITS

The test results confirmed the observations made in the field that soft bits are detrimental to the torque generating ability of the recess/bit combination. The degradation was highly dependent on the particular design. One problem that was not duplicated in the laboratory is the rapid wear that is suffered by the soft bits which in turn results in reduced torque capability. (See Subsection III-7 on worn bits.)

The Phillips and Torx bits, which have relatively fine points, compared to the other bits tested, failed by plastic deformation or fracture and therefore produced no torque for the second cam-out attempt. There was some plastic deformation but no serious damage (such as



breakage) of the Hi-Torque, Torq-Set, and Tri-Wing bits. The Tri-Wing in this case had the highest torque capability for the first cam-out but the Torq-Set recess/bit combination had the highest remaining (second cam-out) torque capability. Table 7 contains a comparison of the soft bits and the baseline bits for the ideal condition test.

TABLE 7  
SOFT BIT DATA

		PHILLIPS TORQUE, IN-LBS.	HI-TORQUE TORQUE, IN-LBS.	TORQ-SET TORQUE, IN-LBS.	TRI WING TORQUE, IN-LBS.	TORX TORQUE, IN-LBS.
Hard Bits	1st	96.5	84.7	122.8	112.3	103.0
	2nd	54.7	8.0	49.5	18.5	0
Soft Bits	1st	61.9	78.5	76.2	90.5	67.3
	2nd	0	9.8	27.0	12.5	0
Δ 1st Cam-Out		-36%	-7%	-38%	-19%	-35%
Δ 2nd Cam-Out		-100%	+22.5%	-46%	-33%	-

6. UNDERSIZED BITS

As expected, this turned out to be a severe test and will probably be labeled unrealistic by some. However, the author's personal experience and also the observation of the field team was that undersized bits are being used by inexperienced mechanics because the numbering system of the bits and recesses is confusing to them. Even experienced mechanics used them when the proper size was not handy. (NOTE: Not only is the numbering system confusing, the names of the recesses were being confused and worse yet, some recesses were thought to require higher torque than others.)

As can be seen from Table 8, torque capability was reduced from 45 to 22% with the undersized bits. The Torx was the worst and the Torq-Set gave the best results in this case. A zero reading in this test would have been perfectly acceptable for this condition for obvious reasons.

Again there is no common trend for the second cam-out torque values. The low value for Torx indicates a basic deficiency of the axisymmetric recesses, once the recess is rounded out, no amount of end load is going to help take the screw out.

TABLE 8  
UNDERSIZED BIT DATA

		PHILLIPS TORQUE, IN-LBS	HI-TORQUE TORQUE, IN-LBS	TORQ-SET TORQUE, IN-LBS	TRI-WING TORQUE, IN-LBS	TORX TORQUE, IN-LBS
Correct Bit	1st	96.5	84.7	122.8	112.3	103.0
	2nd	54.7	8.0	49.5	18.5	0
Undersized Bit	1st	58.8	55.9	95.4	72.9	56.7
	2nd	30.1	13.8	39.7	25.3	8.8
Δ 1st Cam-Out		-39%	-34%	-22%	-35%	-45%
Δ 2nd Cam-Out		-44%	+72%	-20%	+37%	-

#### 7. WORN BIT TEST

The data obtained with the worn bits has limited usefulness and must not be included in any statistical analysis that may be made of the rest of the data.

The wear obtained with the tumbling procedure was, as expected, very uniform. However, distinct differences were noted between this wear and actual field wear. First of all there was no plastic deformation in the artificially worn bits. Certain types of bits are subject to yielding and plastic deformation and this appears to be a very significant mechanism in reducing the torque capability of the bit/recess combination. The flush contact between the recess wall and the bit faces or flutes is lost and a force component is generated that counteracts the applied end load and may even allow the bit to slip out of the recess. The edge of the recess would also be expected to yield or plastically deform. As stated previously, yielding or plastic deformation is more likely to occur with one type of bit than with another and is a factor that must be considered in the recess bit selection process (see also Subsection VII-1).

A damage mode that produces results similar to yielding is shown in Figure 13 where the dashed portions of the bit flutes have either been worn away or the flutes have been plastically deformed to that shape (see also photographs of worn Phillips bit, Figure 11). The tumbling action does not simulate this damage; it does simulate the rounding of the outward facing edges but in this case with a greater radius than field wear. (This radius probably depends on the size of the tumbling media which in this case was relatively large.) The rounding of these outward facing edges in the field appears to be caused more by plastic deformation of the flute faces rather than by wear.

The best simulation obtained was with the Hi-Torque bit where the edges that were worn in the field were also worn in the tumbler. The test results did show a drop in torque capability with these worn bits as did the worn bits collected from the field. The Torx bits also showed a significant torque capability reduction but no field worn bits were available for comparison with the artificially worn bits to see if the two damage modes were comparable. The reason the Phillips and Torq-Set bits showed no torque capability reduction is thought to be that the flutes protected each other and prevented the faces from being worn as described above. The flute faces of the Tri-Wing bit are less protected and a torque capability reduction was observed in this case.

#### 8. STOCK BIT AND SCREW COMPARISON

Since the fasteners and bits for the test were procured as a special order i.e., were made from the same batch of material and received closer quality control, the question naturally came up as to how the performance of the custom made fasteners compared to the performance of fasteners obtained off-the-shelf.

Several tests were run to compare the torque values obtained with off-the-shelf bits and screws to the values obtained in the test program. Besides stainless steel screws, titanium screws were also tested in this follow-on test. The values are tabulated in Tables 9 and 10.

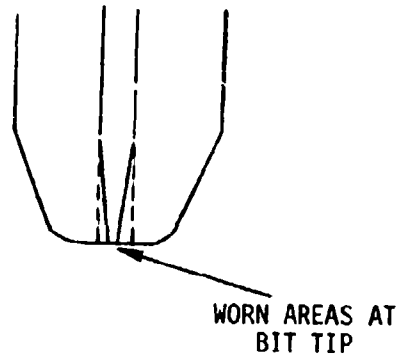


Figure 13. Bit Wear

TABLE 9  
TORQ-SET COMPARISON

FIRST CAM-OUT			
END LOAD LBS	CUSTOM SCREWS A286 TORQUE, IN-LBS	OFF-THE-SHELF SCREWS	
		A286 TORQUE, IN-LBS	TITANIUM TORQUE, IN-LBS
1.3	122.0	122.3	103.0
5.0	123.3	122.7	107.7
10.0	121.3	124.7	109.0
20.0	124.7	125.3	112.0

## SECOND CAM-OUT

10	29.3	32.2	11.0
20	41.5	33.0 *	21.3
60	77.8	88.0	42.3

NOTE: First cam-out values are averages of three tests; second cam-out values are averages of four tests with the exception of \* which is an average of only two values. The comparisons were made between tests under ideal conditions only (no angle, no paint, correct bit, etc.).

TABLE 10  
HI-TORQUE COMPARISON

FIRST CAM-OUT			
END LOAD LBS	CUSTOM SCREWS A286 TORQUE, IN-LBS	OFF-THE-SHELF SCREWS	
		A286 TORQUE, IN-LBS	TITANIUM TORQUE, IN-LBS
1.3	75.3	78.0	66.7
5.0	81.7	86.7	74.3
10.0	88.3	89.3	85.0
20.0	93.3	91.3	82.3

SECOND CAM-OUT			
10	2.5	9.5	6.5
20	4.8	17.5	7.3
60	16.8	27	22.5

For the first cam-out, the torque values obtained were basically the same for the stainless steel screws but the titanium Hi-Torque and Torq-Set screws produced torque values of 11 and 13 percent less than the steel screws. The secondary cam-out values for the steel Torq-Set screws are again comparable but the titanium screws had a greatly reduced torque capability (approximately 51 percent) in this case. The data for the Hi-Torque recess didn't fall out quite as nicely with both the stainless steel and titanium off-the-shelf screws producing higher torque values than the custom screws. The distinction between the two recess types remained however, with the Torq-Set recess performing much better than the Hi-Torque recess.

The somewhat unexpected trend in the Hi-Torque test results may be related to the discovery of interfering tolerances in the bits and recesses and the realization that the Hi-Torque bit/recess combination is quite sensitive to this condition. Some #10 Hi-Torque screws were found with the recesses too shallow and narrow (the custom made bits did not fit into these recesses). One #3 bit was found (in a lot of 50) that was so wide that it wouldn't even fit a 1/4 in. tensile head screw (the blade measured 0.0985 in. vs required 0.0575 in. - 0.0600 in.). Other blades were anywhere from 0.0002 to 0.0041 in. oversized; the 0.0002 in. did not present a problem but the 0.0041 in. did. The findings clarify reports from the field which state that Hi-Torque bits sometimes have to be filed down to make them fit. In addition, the mechanics dislike a close tolerance fit which requires the bit to be rotated into the recess rather than inserted axially; with paint or dirt in the recess this close fit becomes more frustrating.

Some #10 Phillips screws were also found that were too shallow. (0.083 in., 0.085 in., and 0.087 in. for example vs the required 0.093 in. - 0.116 in.); this did not prevent insertion of the bit although it did reduce the torque capability of the recess by more than 20 percent. The findings also confirm that increased emphasis is required on the manufacturers' quality control and government acceptance procedures for bits and fasteners.

#### 9. RIBBED BITS

One of the newer design ideas for bit and recess improvement is the addition of a small rib. This rib is designed to lock the bit and recess together when torque is applied and further prevent cam-out. A fairly limited amount of cast and forged ribbed bits were tested so these results are not conclusive. Although ribbed bits are available in Phillips, Torq-Set, and Tri-Wing, only the Phillips and Torq-Set were tested.

The first major point noted was that under ideal conditions five of nine Phillips bits reached higher torque levels and bit failures instead of recess failures were encountered. With the exception of the 1.3 lb end load, the Torq-Set also showed fairly high torque levels and bit failures instead of recess failures.

The first cam-out appears to damage the rib system resulting in second cam-outs in the same range as unribbed data. The cast bits showed slightly lower failure levels with a brittle failure for the Torq-Set. The average values of these failures are given in Table 11 for comparison.

TABLE 11  
RIBBED BIT CAM-OUT TORQUE (IN-LBS)

End Load (lbs.)	1.3	5	10	20
Non-Ribbed Phillips	94	94	99	100
Ribbed Phillips Cast		87		89
Ribbed Phillips Forged	104	103	107	106
Non-Ribbed Torq-set	122	123	121	125
Ribbed Torq-set Cast				107
Ribbed Torq-set Forged	49	97	99	107



SECTION V  
FIELD DATA OBSERVATIONS

The second major task in the program was the measurement of actual torques, end-loads, and angles that exist in actual aircraft. For this purpose a calibrated speed handle was constructed which could be used at mobile locations. The speed handle with its hardware is shown in Figure 14. This equipment is attached to a recorder for real time vs end load, torque, or angle. This equipment was taken to various Air Force bases to acquire as large a possible cross-section of aircraft type, environment, mechanics experience, mechanics size, and various levels of actual wear. The complete list of all variables and measured parameters is included in Appendix B.

Some of the observations from the field data collection effort have already been mentioned in Subsections IV-2 and 4 on end load and angle selection. A more detailed analysis is included in this section.

#### 1. TORQUE VALUES

Two of the more important, if not the most important, items recorded were the removal and installation torques. Taking the #10 tensile head screws as an example (over 800 data points on Phillips, Hi-Torque, and Torq-Set screws), the mean removal torque was 24.6 in-lbs (standard deviation 14.0) and the mean installation torque was 38.8 in-lbs (standard deviation 15.7). The respective highs were 85 and 90 in-lbs. The significant difference between the mean installation and removal torques was somewhat surprising at first but before we jump to any conclusions about all our screws backing out in flight, there are two observations that should be taken into consideration. At one base, a screwdriver that converts up and down ratcheted motion into torque was used extensively; this tool tends to limit the installation torques to the prescribed value for this size screw. A lot of data was also obtained on aircraft recently received from the factory; unexpectedly, these screws were found to be installed loosely (frequently at much

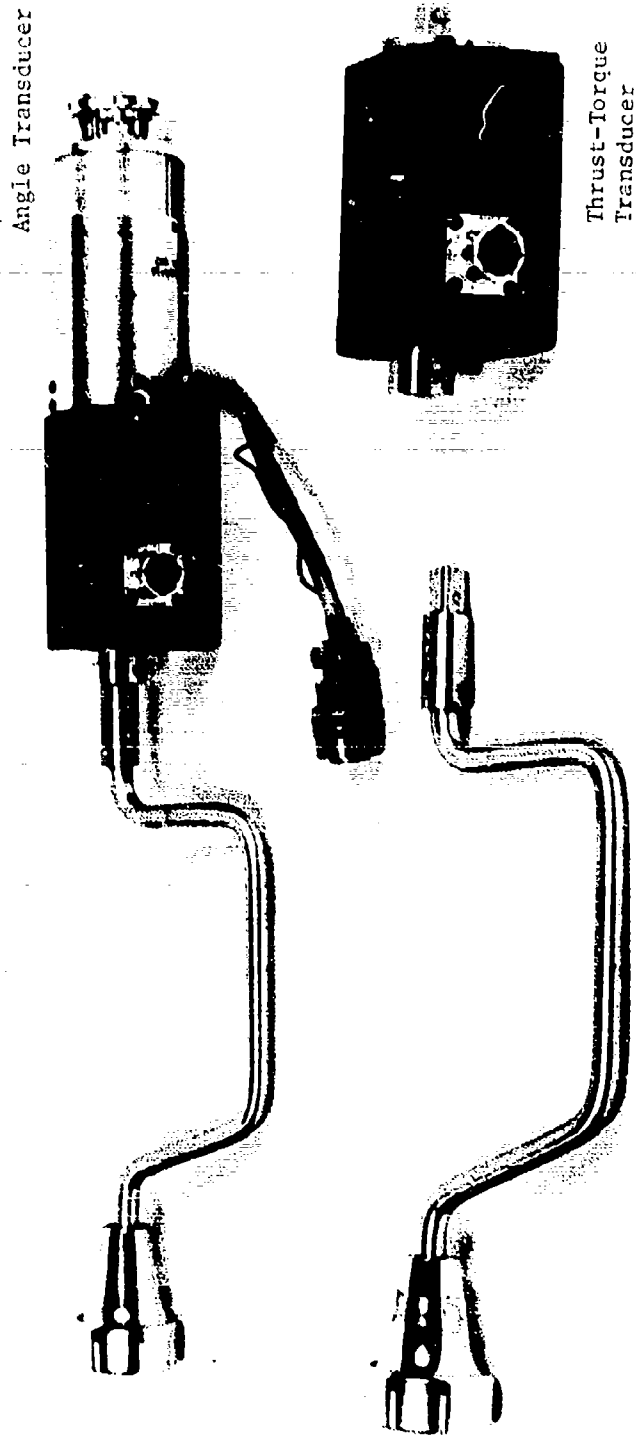


Figure 14. Field Instrumentation Speed Handle

less than the recommended torque value, down to five in-lbs). Nevertheless, the fact remains that the average field installation torque was too high compared to the recommended torque value of around 25 in-lbs. Adding the standard deviation to the mean (54.5 in-lbs) places the torque used on a good percentage of #10 screws into the range recommended for 1/4 in. screws (50-90 in-lbs). It should be kept in mind that all the removals and installations in the field test were with a speed handle. The previous installations could have been done with anything from a screwdriver to a power tool.

When the data points were sorted by recess, only one figure really stood out. In Table 12 notice that the Torq-Set installation torque is appreciably higher than the Phillips and Hi-Torque. The reason for this is not clear; it may either reflect the confidence of the mechanics in this recess or the data may be biased by the unwitting selection of heavy-handed mechanics for this recess. Due to the nationwide location of different aircraft, the same mechanics were not available to loosen and tighten screws with each of the recess designs.

The difference between installation and removal torques for the 1/4 in. tensile head screw is almost significant. The mean torque for removal was 51.5 in. lbs (standard deviation 28.9) and for installation the torque was 52.4 in-lbs (standard deviation 24.7). The maximum values were 134 and 128 in-lbs respectively on sample sizes of 179 and 154. NOTE: The difference between the sample sizes for removal and installation torque is an indication of removal attempt failures. Usually two attempts were made to remove a screw; a difference of 25 in this case would indicate roughly 12 removal failures. A more exact count could be made from Appendix B, columns 51 and 75 of the field data where successful removals and installations are designated by a 1; unsuccessful removals and installations are designated by a 2.

Much of the 1/4 in. tensile head data was on Phillips screws (128 in-lbs removal, 103 in-lbs installation cases) and the removal mean torques in that case was higher than the installation mean torque

TABLE 12  
REMOVAL AND INSTALLATION TORQUES FOR #10 SCREWS

RECESS TYPE	REMOVAL TORQUE, MEAN	REMOVAL TORQUE, STD DEV.	INSTALLATION TORQUE, MEAN	INSTALLATION TORQUE, STD DEV	INSTALLATION TORQUE, MAX.	INSTALLATION SAMPLE SIZE
Phillips	23.1	14.4	37.7	15.0	80	416
Hi-Torque	26.5	13.7	36.0	16.6	88	199
Torq-Set	25.9	13.0	43.2	15.4	90	228
All	24.6	14.0	38.8	15.7	90	843

(56.0 in-lbs vs 51.4 in-lbs). This may be due to the fact that the team had to go to infrequently removed panels to obtain data on 1/4 in. screws; many of these screws proved difficult to remove. The max removal torque was 134 in-lbs along with the 116 lb end load.

## 2. END LOAD

The average end load did not change appreciably with removal and installation. For removal it was 36.3 lbs (standard deviation 20.5 lbs) and for installation it was 35.9 lbs (standard deviation 16.4 lbs). The range was considerable as it went from 5-145 lbs for removal and from 5-112 lbs for installation.

When the data was sorted by three weight groups of mechanics, a definite upward trend of end-load with weight appeared. For weight group 135 lbs and less, the average end load was 29.0 lbs; for 136-165 lbs it went up to 37.4 lbs, and for 166 lbs and over the average end load was up to 42.4 lbs. From this viewpoint the heavier mechanic appears to have an advantage, especially with previously damaged screws where torque capability does increase appreciably with end load as determined in the laboratory tests. The removal end-loads followed a similar pattern.

With the data sorted by orientation (tool pointed down, sideways, and up), some differences in end load were observed but not as much as expected. The highest average of 40.4 lbs was, as expected, in the downward orientation; the lowest of 31.3 lbs was with the sideways orientation and an average of 36.1 lbs was recorded in the upward direction. The highest end loads observed were generated in either the sideways or upward directions when the mechanic was able to brace himself against something (ground, stand, pylon, etc.).

There was no single trend observed with experience of the mechanic but a logical explanation can be offered for the figures observed. Mechanics with less than one year experience used an average of 32.1 lbs for installation end load. With experience of one to nine years, the

average end load was 39.9 lbs and the mechanics with over 10 years experience used an average of 34.0 lbs. The majority of panel installation and removal is done by the mechanics with from zero to nine years experience; the personnel with 10 years or over experience are usually in supervisory positions and do little wrench turning. Curiously, there was a considerable difference between removal and installation end loads for the supervisory personnel (40.1 vs 34.0 lbs.) whereas the other two groups had removal and installation end loads within a few pounds of each other.

### 3. OFFSET ANGLE

The offset angle measurement, to our knowledge, was somewhat of a unique measurement. Previously the offset was visually observed to be present but just how large the angles were and what the effect was on torque capability was not known. The maximum values were as high as expected but the averages were slightly lower than expected. There was no apparent correlation between peak torque and maximum offset angle; the maximum angle normally occurred somewhere else in the installation or removal cycle. For all the #10 tensile head screws (886 cases) the average maximum removal angle was  $3.6^\circ$  (standard deviation  $2.6^\circ$ ) with a range of  $13.5^\circ$ .

When the data was sorted by experience of the mechanic, it did appear that there was an improvement with experience up to a point. The mechanics with less than one year experience had an average maximum removal angle of  $4.6^\circ$  (standard deviation  $3.0^\circ$ ) compared to  $3.1^\circ$  (standard deviation  $2.5^\circ$ ) for the mechanics with one to nine years experience. The catch, of course, is that much of the panel removal is normally done by the most inexperienced mechanics. No further improvement was noted with mechanics having over 10 years experience.

Somewhat surprisingly, as shown in Table 13, no really large differences were detected with orientation. It was thought that tool alignment might be most difficult to judge in the upward direction

but there appears to be no difference between the downward and upward orientations with the horizontal alignment being slightly easier to judge and maintain. It is interesting to note that in each case the removal angle was greater than the installation angle.

TABLE 13  
ORIENTATION VS INSTALLATION AND REMOVAL ANGLES

	DOWN		HORIZONTAL		UP	
	MEAN	STAND. DEV'N	MEAN	STAND. DEV'N	MEAN	STAND. DEV'N
REMOVAL	3.8°	2.6°	3.4°	2.6°	3.8°	2.7°
INSTALLATION	3.6°	2.7°	3.0°	2.6°	3.5°	2.6°

The data was also sorted by recess type and is shown in Table 14.

TABLE 14  
TYPE VS INSTALLATION AND REMOVAL ANGLES

	PHILLIPS		HI-TORQUE		TORQ-SET	
	MEAN	STAND. DEV'N	MEAN	STAND. DEV'N	MEAN	STAND. DEV'N
REMOVAL	4.0°	2.7°	3.0°	2.3°	3.5°	2.6°
INSTALLATION	3.6°	2.7°	2.8°	2.4°	3.4°	2.7°

Just what, if anything, the recorded differences mean is not clear; it is possible that mechanics have learned to be more careful and obtain better tool alignment with one recess as compared to another.

The highest offset angles were recorded with 1/4 in. shear head screws (206 cases). The average maximum removal angle was 4.6° (standard deviation 3.4°) and the installation angle was 4.1° (standard deviation 3.0°). The average torque values and end loads were also higher than for the #10 tensile head screws so it is conceivable that alignment is more difficult to maintain as torques and end loads increase.



SECTION VI  
INSTALLATION TO REMOVAL TORQUE RATIO TEST

Besides investigating what factors reduced the torque capability of recesses, a test was also run to determine what factors were causing some screws to require a removal torque greater than their respective installation torques and what the magnitude of the differences were.

Experience tells us that in a small percentage of the attempted removals, recess failures occur because the torque required to remove the screw is greater than the torque the recess can withstand. Some of these failures are probably due to less than ideal torque application conditions (offset angle, paint, worn bit, etc.) but others are thought to be caused by the screw "freezing" in the hole for some reason. Some of the underlying causes for this freezing might be (1) very high installation torque (near ultimate for recess), (2) the introduction of shear loads after installation, causing binding, (3) the threads galling in the nut, (4) poor nut material, (5) sealant or primer on the shank and in the threads, and (6) corrosion. Several of these factors were investigated in a separate task. Fasteners were installed in lap shear specimens and the installation torque was closely controlled with an electronic read-out torque wrench. Two different materials were used for the screws, sealant was used with a number of specimens, two different levels of corrosion (50 and 150 hours in the salt spray chamber) were used in addition to the noncorroded baseline, and cyclic loading was also applied to a number of specimens.

The results of this task will be reported separately in detail. Briefly, removal torque to installation torque ratios (R/I) varied from 0.73 to 1.96. As expected, exposure to a corrosive environment did increase the R/I ratio and several recesses failed during the removal attempt, most of them after the 150 hour exposure. In general, the R/I ratio also increased after cycling but not as much as after corrosion.

SECTION VII  
RECOMMENDATIONS AND CONCLUSIONS

1. GRADUAL RECESS WEAR TEST

Initially, an attempt was made in this program to induce a gradual wear type failure of the recesses; however, the method chosen was not very effective in simulating the recess wear that has been observed in the field. The equipment used in the test consisted of a seated screw to which tightening or loosening torque was applied at various end loads and angles; the screw was not permitted to turn. In addition to that, the mechanism applying the torque was not capable of applying torque through more than  $\pm 120^\circ$ . It was observed that little or no recess damage occurred if tightening and removal torque was simply applied for a number of cycles. Depending on the torque values selected this was more a bit test than a recess test and this type of testing was discontinued. What is essential is a test machine that can repeatedly drive a screw into a block to a recommended torque, back the screw out again for a certain number of turns and repeat the cycle over and over again. Testing a bit and screw with perfect alignment (zero degree offset) is not expected to show any drastic results; however, testing at an offset angle should show some very interesting results for some types of recesses, especially those with recess sides perpendicular to the screw face such as the internal hex and Torx, referred to as axisymmetric recesses in this report. It was observed in the field that even with a very deep internal hex recess (such as on the 3/8 in. Tridair panel fasteners) mechanics frequently exceeded the  $7^\circ$  offset angle used in this program.

Many of these recesses were being rounded out and numerous bits were also being broken. This indicates that some very high stresses were being induced in the bits and recesses. A test as described above should weed out the bit and recess combinations that are sensitive to offangle torque application over the long term. In the interim, it may be advantageous to use a universal joint between the speed handle and bit with the removal and installation of (deep) internal hex panel fasteners.

## 2. WORN BIT TEST

If worn bits are to be used in future bit/recess tests, it is recommended that the bits be worn under controlled laboratory conditions and with realistic parameters. These parameters should include a fixed end load (25 lbs for example), an offset angle ( $\pm 7^\circ$ ), a specified torque (at least double the recommended "hook" torque), a certain number of turns (six or seven to stay within the normal threaded length) to get the rubbing action between the bit and the recess (caused by the offset angle), and a certain number of cycles determined initially by desired wear but then fixed for all future tests. Screws could be actual or simulated. If actual screws were used, they would probably have to be changed every so many cycles due to wear; a simulated screw made from a threaded rod of very hard material might last for the required number of cycles. Hardening of available screws could also be investigated. A possible flaw with the foregoing procedure is that a bit fatigue failure could be experienced before sufficient wear was induced. This would depend on the design of the bit.

## 3. CONCLUSIONS

The decision as to which recess is adopted should not be based solely on the numbers that were obtained in the tests. Rather, the selection should be based on the performance, as a whole, of the system of recesses and bits that are meant to be, or might be, used together under conditions that will be encountered in the field. From the field data and observations it can be stated that fasteners will be torqued to values greater than recommended, mechanics will attempt to remove screws with paint in the recesses, and tool alignment will seldom be perfect (with off angles greater than  $10^\circ$  not being uncommon). From field surveys it is also known that brittle and soft bits will find their way into the tool boxes.

From the above and the laboratory test data, it can be concluded that a recess should not be unnecessarily shallow, i.e., within the tension and fatigue requirements, the recess should be as deep as possible to keep the stresses at the edges of the recess as low as possible.

Less than ideal conditions such as paint, off-angle, undersized bits, or a combination of these can result in recess stresses that are at or near the ultimate level for shallow recesses. For example, the average torque capability of the Hi-Torque recess with all three of the above conditions applied simultaneously was 38.7 in-lbs; the mean (installation) torque applied to a sample of 886 No. 10 screws in the field was 38.8 in-lbs with a standard deviation of 15.7 in-lbs.

The recess should not be small in diameter for several reasons: a small recess will require a small bit and a soft bit for this recess will yield and plastically deform, a very hard bit will break and paint or dirt will drastically (percentage wise) reduce the bearing area for torque application. Wear will also impact a small bit sooner.

With some recess types, a piece of a broken bit may jam in the recess and will be difficult to get out. The Torx recess had this problem in this program with the painted screws being especially vulnerable.

Consideration must also be given as to whether bits other than the one intended for the recess could be used and how damaging this would be. For example, a No. 1 Phillips bit in a No. 2 recess; a No. 2 Hi-Torque bit in a No. 3 recess; a No. 8 Torq-Set bit in a No. 10 recess, or worse than that a No. 2 Phillips in a No. 10 Torq-Set recess. With paint in the recess a tendency may exist to go to the next smaller size bit if the proper size didn't seem to fit.

A recess design that is axisymmetric initially looks good because one would think this forces proper tool alignment. However, when one looks at the bearing loads that are generated on the recess when leverage is applied one realizes why such a recess could be worn out rather rapidly. That these offset angles actually existed was shown by recording field data on deep internal hex recesses; angles up to ten degrees were recorded. The use of speed handle aggravates the problem. Since torque

is applied to the recess by a force acting through a moment arm this force also has to be reacted by the recess. A small off-set angle ( $\pm 7^\circ$ ) will produce a point-load at the edge of the recess, adding to the wear problem.

Only one axisymmetric recess was tested in the laboratory and that was the Torx recess. This recess was possibly designed not to cam-out. Again, this probably would be a good philosophy if field conditions were always ideal. As stated previously, they are not and no amount of training, supervision, and quality control appears to be able to insure ideal conditions in the field. Therefore, it is the designer's responsibility to design against as many of the nonideal conditions as possible. A problem peculiar to the axisymmetric is that once the recess is cammed out, no amount of additional end load will help to generate the torque required to remove the screw. As can be seen from the data, available torque after the first cam-out for the other recesses tested is strongly dependent on the end load applied. The loss of this feature is thought to be very disadvantageous.

No final recommendation is given explicitly in this report as to which recess the engineer should select for his particular application. The authors feel that the engineer should look at the test methods used, the results obtained, and the arguments presented and make his own selection. However, the authors are encouraged by the results of the tests in that they do fall in line with personal experience and the preferences of the majority of the mechanics interviewed in the field.

## APPENDIX A

## RAW LAB DATA

The following list contains the raw data from laboratory yield testing. It is coded as follows -

## Column

- 1-2 Matrix number of test
- 3-5 Screw Recess Type: PH=Phillips, HT=High Torque, TS=Torq-set, TX=TORX, TW=TRI-Wing, PRC=Ribbed Phillips with cast bit, PRF=Ribbed Phillips with forged bit, TRC=Ribbed Torq-set with cast bit, TRF=Ribbed Torq-set with forged bit, SHT=Stock Hi-Torque steel, THT=Stock Hi-Torque titanium, STS=Torq-set stock steel, TTS=Titanium Torq-set stock
- 6-7 Test number in set
- 8-9 Head Type; T=Tension, S=Shear
- 10-11 Screw; 2=1/8" diameter, 3=3/16" diameter, 4=1/4" diameter
- 12-13 Paint; Y=Yes, N=No
- 14-15 Angle; 0=0°, 7=7°
- 16-17 Bit Condition; N=New, W=Worn
- 18-19 Bit Hardness; H=Hard, S=Soft, N=Stock
- 20-21 Bit Size; C=Correct, U=Undersize
- 22-27 End load First Test
- 28-30 Maximum Torque
- 31-33 Recess Condition; RF=Fair, RN=New, RW=Worn
- 34-36 Bit Condition; BN=New, BF=Fair, BW=Worn, BB=Broken
- 37-38 Was Test Run to Failure; Y=Yes, N=No
- 39-41 End load second test
- 42-46 Maximum Torque
- 47-54 Same code 31-38

01	PH	1	T	3	N	0	N	H	C	1.3	91	RF	BN	Y	10	46	RW	BN	Y
01	PH	2	T	3	N	0	N	H	C	1.3	94	RF	BN	Y	20	64	RW	BN	Y
01	PH	3	T	3	N	0	N	H	C	1.3	96	RF	BN	Y					
01	PH	4	T	3	N	0	N	H	C	1.3	98	RF	BN	Y					
01	PH	1	T	3	N	0	N	H	C	5	97	RF	BN	Y	10	40	RW	BN	Y
01	PH	2	T	3	N	0	N	H	C	5	99	RF	BN	Y	20	59	RW	BN	Y
01	PH	3	T	3	N	0	N	H	C	5	99	RF	BN	Y	40	77	RW	BN	Y
01	PH	4	T	3	N	0	N	H	C	5	92	RF	BN	Y					
01	PH	1	T	3	N	0	N	H	C	10	100	RF	BN	Y	10	37	RW	BN	Y
01	PH	2	T	3	N	0	N	H	C	10	100	RF	BN	Y	20	50	RW	BN	Y
01	PH	3	T	3	N	0	N	H	C	10	96	RF	BN	Y	40	73	RW	BN	Y
01	PH	4	T	3	N	0	N	H	C	10	98	RF	BN	Y	60	69	RW	BN	Y
01	PH	1	T	3	N	0	N	H	C	20	101	RF	BN	Y	10	35	RW	BN	Y
01	PH	2	T	3	N	0	N	H	C	20	99	RF	BN	Y	20	32	RW	BN	Y
01	PH	3	T	3	N	0	N	H	C	20	100	RF	BN	Y	40	55	RW	BN	Y
01	PH	4	T	3	N	0	N	H	C	20	100	RF	BN	Y	60	74	RW	BN	Y
02	PH	1	T	3	N	7	N	H	C	1.3	71	RF	BN	Y	10	25	RF	BN	Y
02	PH	2	T	3	N	7	N	H	C	1.3	68	RF	BN	Y	20	34	RF	BN	Y
02	PH	3	T	3	N	7	N	H	C	1.3	68	RF	BN	Y	40	12	RF	BN	Y
02	PH	4	T	3	N	7	N	H	C	1.3	68	RF	BN	Y	60	20	RW	BN	Y
02	PH	1	T	3	N	7	N	H	C	5	63	RF	BN	Y	10	5	RW	BN	Y
02	PH	2	T	3	N	7	N	H	C	5	71	RF	BN	Y	20	12	RW	BN	Y
02	PH	3	T	3	N	7	N	H	C	5	63	RF	BN	Y	40	11	RW	BN	Y
02	PH	4	T	3	N	7	N	H	C	5	59	RF	BN	Y	60	10	RW	BN	Y
02	PH	1	T	3	N	7	N	H	C	10	63	RF	BN	Y	10	3	RW	BN	Y
02	PH	2	T	3	N	7	N	H	C	10	70	RF	BN	Y	20	19	RW	BN	Y
02	PH	3	T	3	N	7	N	H	C	10	71	RF	BN	Y	40	19	RW	BN	Y
02	PH	4	T	3	N	7	N	H	C	10	71	RF	BN	Y	60	29	RW	BN	Y
02	PH	1	T	3	N	7	N	H	C	20	76	RF	BN	Y	10	16	RW	BN	Y
02	PH	2	T	3	N	7	N	H	C	20	66	RF	BN	Y	20	9	RW	BN	Y
02	PH	3	T	3	N	7	N	H	C	20	78	RF	BN	Y	40	22	RW	BN	Y
02	PH	4	T	3	N	7	N	H	C	20	76	RF	BN	Y	60	23	RW	BN	Y
03	PH	1	T	3	N	0	N	H	U	1.3	58	RF	BN	Y	10	3	RF	BN	Y
03	PH	2	T	3	N	0	N	H	U	1.3	52	RF	BN	Y	20	27	RF	BN	Y
03	PH	3	T	3	N	0	N	H	U	1.3	52	RF	BN	Y	40	37	RW	BN	Y
03	PH	4	T	3	N	0	N	H	U	1.3	55	RF	BN	Y	60	46	RW	BN	Y
03	PH	1	T	3	N	0	N	H	U	5	56	RF	BN	Y	10	10	RW	BN	Y
03	PH	2	T	3	N	0	N	H	U	5	62	RF	BN	Y	20	13	RW	BN	Y
03	PH	3	T	3	N	0	N	H	U	5	59	RF	BN	Y	40	47	RW	BN	Y
03	PH	4	T	3	N	0	N	H	U	5	63	RF	BN	Y	60	37	RW	BN	Y
03	PH	1	T	3	N	0	N	H	U	10	61	RF	BN	Y	10	39	RW	BN	Y
03	PH	2	T	3	N	0	N	H	U	10	58	RF	BN	Y	20	19	RW	BN	Y
03	PH	3	T	3	N	0	N	H	U	10	63	RF	BN	Y	40	41	RW	BN	Y
03	PH	4	T	3	N	0	N	H	U	10	57	RF	BN	Y	60	35	RW	BN	Y
03	PH	1	T	3	N	0	N	H	U	20	58	RF	BN	Y	10	27	RW	BN	Y
03	PH	2	T	3	N	0	N	H	U	20	59	RF	BN	Y	20	31	RW	BN	Y
03	PH	3	T	3	N	0	N	H	U	20	65	RF	BN	Y	40	26	RW	BN	Y
03	PH	4	T	3	N	0	N	H	U	20	61	RF	BN	Y	60	44	RW	BN	Y
04	PH	1	T	3	N	7	N	H	U	1.3	53	RF	BN	Y	10	19	RF	BN	Y
04	PH	2	T	3	N	7	N	H	U	1.3	49	RF	BN	Y	20	12	RF	BN	Y
04	PH	3	T	3	N	7	N	H	U	1.3	53	RF	BN	Y	40	19	RW	BN	Y
04	PH	4	T	3	N	7	N	H	U	1.3	53	RF	BN	Y	60	12	RW	BN	Y
04	PH	1	T	3	N	7	N	H	U	5	57	RF	BN	Y	10	8	RW	BN	Y
04	PH	2	T	3	N	7	N	H	U	5	61	RF	BN	Y	20	11	RW	BN	Y
04	PH	3	T	3	N	7	N	H	U	5	56	RF	BN	Y	40	15	RW	BN	Y
04	PH	4	T	3	N	7	N	H	U	5	56	RF	BN	Y	60	17	RW	BN	Y
04	PH	1	T	3	N	7	N	H	U	10	62	RF	BN	Y	10	3	RW	BN	Y
04	PH	2	T	3	N	7	N	H	U	10	55	RF	BN	Y	20	6	RW	BN	Y

04	PH	3	T	3	N	7	N	H	U	10	50	RF	BN	Y	40	7	RW	BN	Y
04	PH	4	T	3	N	7	N	H	U	10	57	RF	BN	Y	60	32	RW	BN	Y
04	PH	1	Y	3	N	7	N	H	U	20	64	RF	BN	Y	10	3	RW	BN	Y
04	PH	2	T	3	N	7	N	H	U	20	56	RF	BN	Y	20	8	RW	BN	Y
04	PH	3	T	3	N	7	N	H	U	20	64	RF	BN	Y	40	9	RW	BN	Y
04	PH	4	T	3	N	7	N	H	U	20	63	RF	BN	Y	60	47	RW	BN	Y
05	PH	1	T	3	N	0	N	S	C	1.3	61	RN	BB	Y	20	58	RN	BB	Y
05	PH	2	T	3	N	0	N	S	C	1.3	60	RN	BB	Y	60	61	RN	BB	Y
05	PH	1	T	3	N	0	N	S	C	5	62	RN	BB	Y	20	58	RN	BB	Y
05	PH	2	T	3	N	0	N	S	C	5	57	RN	BB	Y	60	62	RN	BB	Y
05	PH	1	T	3	N	0	N	S	C	10	62	RN	BB	Y	20	58	RN	BB	Y
05	PH	2	T	3	N	0	N	S	C	10	64	RN	BB	Y	60	62	RN	BB	Y
05	PH	1	T	3	N	0	N	S	C	20	64	RN	BB	Y	20	59	RN	BB	Y
05	PH	2	T	3	N	0	N	S	C	20	65	RN	BB	Y	60	63	RN	BB	Y
06	PH	1	T	3	N	7	N	S	C	1.3	44	RN	BB	Y	20	41	RN	BB	Y
06	PH	2	T	3	N	7	N	S	C	1.3	40	RN	BB	Y	60	47	RN	BB	Y
06	PH	1	T	3	N	7	N	S	C	5	42	RN	BB	Y					
06	PH	2	T	3	N	7	N	S	C	5	42	RN	BB	Y	60	49	RN	BB	Y
06	PH	2	T	3	N	7	N	S	C	10	49	RN	BB	Y					
06	PH	2	T	3	N	7	N	S	C	10	44	RN	BB	Y	60	46	RN	BB	Y
06	PH	1	T	3	N	7	N	S	C	20	46	RN	BB	Y	20	39	RN	BB	Y
06	PH	2	T	3	N	7	N	S	C	20	51	RN	BB	Y	60	49	RN	BB	Y
07	PH	1	T	3	N	0	N	S	U	1.3	38	RN	BF	Y	10	12	RN	BF	Y
07	PH	2	T	3	N	0	N	S	U	1.3	34	RN	BF	Y	20	22	RN	BF	Y
07	PH	3	T	3	N	0	N	S	U	1.3	38	RN	BF	Y	40	24	RN	BF	Y
07	PH	4	T	3	N	0	N	S	U	1.3	36	RN	BF	Y	60	32	RN	BF	Y
07	PH	1	T	3	N	0	N	S	U	5	39	RN	BF	Y	10	7	RN	BF	Y
07	PH	2	T	3	N	0	N	S	U	5	38	RN	BF	Y	20	10	RN	BF	Y
07	PH	3	T	3	N	0	N	S	U	5	38	RN	BF	Y	40	16	RN	BF	Y
07	PH	4	T	3	N	0	N	S	U	5	41	RN	BF	Y	60	19	RN	BF	Y
07	PH	1	T	3	N	0	N	S	U	10	39	RN	BF	Y	10	5	RN	BF	Y
07	PH	2	T	3	N	0	N	S	U	10	41	RN	BF	Y	20	22	RN	BF	Y
07	PH	3	T	3	N	0	N	S	U	10	40	RN	BF	Y	60	16	RN	BF	Y
07	PH	1	T	3	N	0	N	S	U	20	43	RN	BF	Y	10	2	RN	BF	Y
07	PH	2	T	3	N	0	N	S	U	20	43	RN	BF	Y	20	25	RN	BF	Y
07	PH	3	T	3	N	0	N	S	U	20	42	RN	BF	Y	60	23	RN	BF	Y
07	PH	4	T	3	N	0	N	S	U	20	42	RN	BF	Y	60	41	RN	BF	Y
08	PH	1	T	3	N	7	N	S	U	1.3	32	RN	BF	Y	20	34	RF	BF	Y
08	PH	2	T	3	N	7	N	S	U	1.3	32	RN	BF	Y	60	36	RF	BF	Y
08	PH	1	T	3	N	7	N	S	U	5	33	RN	BF	Y	20	10	RF	BF	Y
08	PH	2	T	3	N	7	N	S	U	5	36	RN	BF	Y	60	34	RF	BF	Y
08	PH	1	T	3	N	7	N	S	U	10	35	RN	BF	Y	20	10	RF	BF	Y
08	PH	2	T	3	N	7	N	S	U	10	37	RN	BF	Y	60	38	RF	BF	Y
08	PH	1	T	3	N	7	N	S	U	20	36	RN	BF	Y	20	23	RF	BF	Y
08	PH	2	T	3	N	7	N	S	U	20	38	RN	BF	Y	60	40	RF	BF	Y
09	PH	1	T	3	N	0	W	H	C	1.3	101	RW	BF	Y	10	2	RW	BF	Y
09	PH	2	T	3	N	0	W	H	C	1.3	99	RW	BF	Y	20	2	RW	BF	Y
09	PH	3	T	3	N	0	W	H	C	1.3	103	RW	BF	Y	60	4	RW	BF	Y
09	PH	1	T	3	N	0	W	H	C	5	104	RW	BF	Y	10	1	RW	BF	Y
09	PH	2	T	3	N	0	W	H	C	5	103	RW	BF	Y	20	2	RW	BF	Y
09	PH	3	T	3	N	0	W	H	C	5	102	RW	BF	Y	60	9	RW	BF	Y
09	PH	1	T	3	N	0	W	H	C	10	98	RW	BF	Y	10				
09	PH	2	T	3	N	0	W	H	C	10	105	RW	BF	Y	20				
09	PH	3	T	3	N	0	W	H	C	10	99	RW	BF	Y	60	9	RW	BF	Y
09	PH	1	T	3	N	0	W	H	C	20	103	RW	BF	Y	10	2	RW	BF	Y
09	PH	2	T	3	N	0	W	H	C	20	105	RW	BF	Y	20	2	RW	BF	Y
09	PH	3	T	3	N	0	W	H	C	20	106	RW	BF	Y	60				
10	PH	2	T	3	N	7	W	H	C	1.3	70	RF	BF	Y	20	1	RF	BF	Y



10	PH	3	T	J	N	7	W	H	C	1.3	57	RF	BF	Y	60	19	RW	BF	Y
10	PH	2	T	J	N	7	W	H	C	5	58	RF	BF	Y	10	2	RF	BF	Y
10	PH	2	T	J	N	7	W	H	C	5	61	RF	BF	Y	20	20	RF	BF	Y
10	PH	3	T	J	N	7	W	H	C	5	59	RF	BF	Y	60	4	RF	BF	Y
10	PH	1	T	J	N	7	W	H	C	10	63	RF	BF	Y	10	6	RF	BF	Y
10	PH	2	T	J	N	7	W	H	C	10	56	RF	BF	Y	20	28	RF	BF	Y
10	PH	3	T	J	N	7	W	H	C	10	70	RF	BF	Y	60	21	RF	BF	Y
10	PH	1	T	J	N	7	W	H	C	20	67	RF	BF	Y	10	9	RF	BF	Y
10	PH	2	T	J	N	7	W	H	C	20	67	RF	BF	Y	20	6	RF	BF	Y
10	PH	3	T	J	N	7	W	H	C	20	58	RF	BF	Y	60	34	RF	BF	Y
13	PH	1	T	J	N	0	H	S	C	1.3	57	RF	BN	Y	20	-8	RF	BN	N
13	PH	2	T	J	N	0	H	S	C	1.3	56	RF	BN	Y	60	50	RF	BN	N
13	PH	1	T	J	N	0	H	S	C	5	57	RF	BN	Y	10	50	RF	BN	N
13	PH	2	T	J	N	0	H	S	C	5	59	RF	BN	Y	20	53	RF	BN	N
13	PH	1	T	J	N	0	H	S	C	10	61	RF	BN	Y	10	52	RF	BN	N
13	PH	2	T	J	N	0	H	S	C	10	58	RF	BN	Y	20	53	RF	BN	N
13	PH	3	T	J	N	0	H	S	C	10	54	RF	BN	Y	60	52	RF	BN	N
13	PH	1	T	J	N	0	H	S	C	20	59	RF	BN	Y	10	51	RF	BN	N
13	PH	2	T	J	N	0	H	S	C	20	63	RF	BN	Y	20	52	RF	BN	N
13	PH	3	T	J	N	0	H	S	C	20	50	RF	BN	Y	60	50	RF	BN	N
14	PH	1	T	J	N	7	W	S	C	1.3	36	RF	BF	Y	20	26	RF	BF	Y
14	PH	2	T	J	N	7	W	S	C	1.3	37	RF	BF	Y	60	27	RF	BF	Y
14	PH	1	T	J	N	7	W	S	C	5	40	RF	BF	Y	10	3	RF	BF	Y
14	PH	2	T	J	N	7	W	S	C	5	40	RF	BF	Y	20	4	RF	BF	Y
14	PH	3	T	J	N	7	W	S	C	5	38	RF	BF	Y	60	28	RF	BF	Y
14	PH	1	T	J	N	7	W	S	C	10	42	RF	BF	Y	10	3	RF	BF	Y
14	PH	2	T	J	N	7	W	S	C	10	40	RF	BF	Y	20	5	RF	BF	Y
14	PH	3	T	J	N	7	W	S	C	10	42	RF	BF	Y	60	19	RF	BF	Y
14	PH	1	T	J	N	7	W	S	C	20	40	RF	BF	Y	10	1	RF	BF	Y
14	PH	2	T	J	N	7	W	S	C	20	39	RF	BF	Y	20	8	RF	BF	Y
14	PH	3	T	J	N	7	W	S	C	20	38	RF	BF	Y	60	11	RF	BF	Y
15	PH	1	T	J	N	0	H	S	U	1.3	46	RF	BN	Y	10	2	RF	BN	Y
15	PH	2	T	J	N	0	H	S	U	1.3	46	RF	BN	Y	20	2	RF	BN	Y
15	PH	3	T	J	N	0	H	S	U	1.3	42	RF	BN	Y	60	11	RF	BN	Y
15	PH	1	T	J	N	0	H	S	U	5	42	RF	BN	Y	10	3	RF	BN	Y
15	PH	2	T	J	N	0	H	S	U	5	45	RF	BN	Y	20	1	RF	BN	Y
15	PH	3	T	J	N	0	H	S	U	5	44	RF	BN	Y	60	3	RF	BN	Y
15	PH	1	T	J	N	0	H	S	U	10	43	RF	BN	Y	10	1	RF	BN	Y
15	PH	2	T	J	N	0	H	S	U	10	48	RF	BN	Y	20	2	RF	BN	Y
15	PH	3	T	J	N	0	H	S	U	10	47	RF	BN	Y	10				
15	PH	1	T	J	N	0	H	S	U	20	46	RF	BN	Y	10	1	RF	BN	Y
15	PH	2	T	J	N	0	H	S	U	20	45	RF	BN	Y	20	1	RF	BN	Y
15	PH	3	T	J	N	0	H	S	U	20	43	RF	BN	Y	60	2	RF	BN	Y
16	PH	1	T	J	N	7	W	S	U	1.3	33	RN	BN	Y	10	8	RN	BN	Y
16	PH	2	T	J	N	7	W	S	U	1.3	26	RN	BN	Y	20	5	RN	BN	Y
16	PH	3	T	J	N	7	W	S	U	1.3	28	RN	BN	Y	60	36	RN	BN	Y
16	PH	1	T	J	N	7	W	S	U	5	35	RN	BN	Y	10	7	RN	BN	Y
16	PH	2	T	J	N	7	W	S	U	5	33	RN	BN	Y	20	2	RN	BN	Y
16	PH	3	T	J	N	7	W	S	U	5	39	RN	BN	Y	10				
16	PH	1	T	J	N	7	W	S	U	10	34	RN	BN	Y	10	2	RN	BN	Y
16	PH	2	T	J	N	7	W	S	U	10	35	RN	BN	Y	20	2	RN	BN	Y
16	PH	3	T	J	N	7	W	S	U	10	32	RN	BN	Y	60	18	RN	BN	Y
16	PH	1	T	J	N	7	W	S	U	20	33	RN	BN	Y	10	2	RN	BN	Y
16	PH	2	T	J	N	7	W	S	U	20	40	RN	BN	Y	20	1	RN	BN	Y
16	PH	3	T	J	N	7	W	S	U	20	38	RN	BN	Y	60	8	RN	BN	Y
17	PH	1	T	J	Y	0	N	H	C	1.3	75	RF	BN	Y	10	30	RF	BN	Y
17	PH	2	T	J	Y	0	N	H	C	1.3	57	RF	BN	Y	20	60	RF	BN	Y
17	PH	3	T	J	Y	0	N	H	C	1.3	71	RF	BN	Y	40	62	RF	BN	Y

17	PH	4	T	3	Y	0	N	H	C	1.3	75	RF	BN	Y	60	73	RF	BN	Y
17	PH	1	T	3	Y	0	N	H	C	5	70	RF	BN	Y	10	52	RF	BN	Y
17	PH	2	T	3	Y	0	N	H	C	5	72	RF	BN	Y	20	44	RF	BN	Y
17	PH	3	T	3	Y	0	N	H	C	5	75	RF	BN	Y	40	66	RF	BN	Y
17	PH	4	T	3	Y	0	N	H	C	5	72	RF	BN	Y	60	72	RF	BN	Y
17	PH	1	T	3	Y	0	N	H	C	10	76	RF	BN	Y	10	59	RF	BN	Y
17	PH	2	T	3	Y	0	N	H	C	10	76	RF	BN	Y	20	50	RF	BN	Y
17	PH	3	T	3	Y	0	N	H	C	10	76	RF	BN	Y	40	55	RF	BN	Y
17	PH	4	T	3	Y	0	N	H	C	13	73	RF	BN	Y	60	61	RF	BN	Y
17	PH	1	T	3	Y	0	N	H	C	20	82	RF	BN	Y	10	27	RF	BN	Y
17	PH	2	T	3	Y	0	N	H	C	20	85	RF	BN	Y	20	41	RF	BN	Y
17	PH	3	T	3	Y	0	N	H	C	20	77	RF	BN	Y	40	33	RF	BN	Y
17	PH	4	T	3	Y	0	N	H	C	20	80	RF	BN	Y	60	62	RF	BN	Y
18	PH	1	T	3	Y	7	N	H	C	1.3	43	RF	BN	Y	10	22	RF	BN	Y
18	PH	2	T	3	Y	7	N	H	C	1.3	51	RF	BN	Y	20	19	RF	BN	Y
18	PH	4	T	3	Y	7	N	H	C	1.3	50	RF	BN	Y	40	25	RF	BN	Y
18	PH	3	T	3	Y	7	N	H	C	1.3	51	RF	BN	Y	60	43	RF	BN	Y
18	PH	1	T	3	Y	7	N	H	C	5	53	RF	BN	Y	10	14	RF	BN	Y
18	PH	2	T	3	Y	7	N	H	C	5	47	RF	BN	Y	20	21	RF	BN	Y
18	PH	4	T	3	Y	7	N	H	C	5	53	RF	BN	Y	40	51	RF	BN	Y
18	PH	3	T	3	Y	7	N	H	C	5	50	RF	BN	Y	60	22	RF	BN	Y
18	PH	1	T	3	Y	7	N	H	C	10	54	RF	BN	Y	10	5	RF	BN	Y
18	PH	2	T	3	Y	7	N	H	C	10	57	RF	BN	Y	20	9	RF	BN	Y
18	PH	4	T	3	Y	7	N	H	C	10	53	RF	BN	Y	40	33	RF	BN	Y
18	PH	3	T	3	Y	7	N	H	C	10	49	RF	BN	Y	60	25	RF	BN	Y
18	PH	1	T	3	Y	7	N	H	C	20	60	RF	BN	Y	10	18	RF	BN	Y
18	PH	2	T	3	Y	7	N	H	C	20	63	RF	BN	Y	20	13	RF	BN	Y
18	PH	3	T	3	Y	7	N	H	C	20	58	RF	BN	Y	40	26	RF	BN	Y
18	PH	4	T	3	Y	7	N	H	C	20	58	RF	BN	Y	60	24	RF	BN	Y
19	PH	4	T	3	Y	0	N	H	U	1.3	36	RW	BF	Y					
19	PH	1	T	3	Y	0	N	H	U	1.3	40	RW	BF	Y	10	16	RW	BF	Y
19	PH	2	T	3	Y	0	N	H	U	1.3	39	RW	BF	Y	20	36	RW	BF	Y
19	PH	3	T	3	Y	0	N	H	U	1.3	41	RW	BF	Y	60	49	RW	BF	Y
19	PH	1	T	3	Y	0	N	H	U	5	48	RW	BF	Y					
19	PH	4	T	3	Y	0	N	H	U	5	45	RW	BF	Y	40	45	RW	BF	Y
19	PH	2	T	3	Y	0	N	H	U	5	44	RW	BF	Y	20	28	RW	BF	Y
19	PH	3	T	3	Y	0	N	H	U	5	45	RW	BF	Y	60	52	RW	BF	Y
19	PH	1	T	3	Y	0	N	H	U	10	52	RW	BF	Y	10	29	RW	BF	Y
19	PH	4	T	3	Y	0	N	H	U	10	52	RW	BF	Y	40	52	RW	BF	Y
19	PH	2	T	3	Y	0	N	H	U	10	48	RW	BF	Y	20	32	RW	BF	Y
19	PH	3	T	3	Y	0	N	H	U	10	52	RW	BF	Y					
19	PH	1	T	3	Y	0	N	H	U	20	53	RW	BF	Y	10	25	RW	BF	Y
19	PH	2	T	3	Y	0	N	H	U	20	50	RW	BF	Y					
19	PH	3	T	3	Y	0	N	H	U	20	55	RW	BF	Y	60	50	RW	BF	Y
19	PH	4	T	3	Y	0	N	H	U	20	52	RW	BF	Y	40	32	RW	BF	Y
20	PH	1	T	3	Y	7	N	H	U	1.3	37	RF	BN	Y	10	3	RF	BN	Y
20	PH	2	T	3	Y	7	N	H	U	1.3	41	RF	BN	Y	20	23	RF	BN	Y
20	PH	3	T	3	Y	7	N	H	U	1.3	39	RF	BN	Y	60	37	RF	BN	Y
20	PH	1	T	3	Y	7	N	H	U	5	41	RF	BN	Y	10	13	RF	BN	Y
20	PH	2	T	3	Y	7	N	H	U	5	43	RF	BN	Y	20	8	RF	BN	Y
20	PH	4	T	3	Y	7	N	H	U	5	41	RF	BN	Y	40	9	RF	BN	Y
20	PH	3	T	3	Y	7	N	H	U	5	44	RF	BN	Y	60	33	RF	BN	Y
20	PH	1	T	3	Y	7	N	H	U	10	47	RF	BN	Y	10	5	RF	BN	Y
20	PH	2	T	3	Y	7	N	H	U	10	47	RF	BN	Y	20	25	RF	BN	Y
20	PH	4	T	3	Y	7	N	H	U	10	47	RF	BN	Y	40	43	RF	BN	Y
20	PH	3	T	3	Y	7	N	H	U	10	48	RF	BN	Y	60	34	RF	BN	Y
20	PH	1	T	3	Y	7	N	H	U	20	50	RF	BN	Y	10	3	RF	BN	Y
20	PH	2	T	3	Y	7	N	H	U	20	56	RF	BN	Y	20	23	RF	BN	Y

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20	PH	4	T	3	Y	7	N	H	U	20	50	RF	BN	Y	40	7	RF	BN	Y
20	PH	3	T	3	Y	7	N	H	U	20	51	RF	BN	Y	60	25	RF	BN	Y
21	PH	4	T	3	Y	0	N	S	C	1.3	48	RN	BF	Y	40	16	RN	BN	Y
21	PH	1	T	3	Y	0	N	S	C	1.3	48	RN	BF	Y	10	33	RN	BN	Y
21	PH	2	T	3	Y	0	N	S	C	1.3	48	RN	BF	Y	20	33	RN	BN	Y
21	PH	3	T	3	Y	0	N	S	C	1.3	45	RN	BF	Y	60	39	RN	BN	Y
21	PH	1	T	3	Y	0	N	S	C	5	52	RN	BF	Y	10	34	RN	BN	Y
21	PH	4	T	3	Y	0	N	S	C	5	52	RN	BF	Y	40	36	RN	BN	Y
21	PH	2	T	3	Y	0	N	S	C	5	50	RN	BF	Y	20	36	RN	BN	Y
21	PH	3	T	3	Y	0	N	S	C	5	49	RN	BF	Y	60	31	RN	BN	Y
21	PH	1	T	3	Y	0	N	S	C	10	48	RN	BF	Y	10	38	RN	BN	Y
21	PH	2	T	3	Y	0	N	S	C	10	46	RN	BF	Y	20	36	RN	BN	Y
21	PH	4	T	3	Y	0	N	S	C	10	51	RN	BF	Y	40	14	RN	BN	Y
21	PH	3	T	3	Y	0	N	S	C	10	50	RN	BF	Y	60	40	RN	BN	Y
21	PH	1	T	3	Y	0	N	S	C	20	54	RN	BF	Y	10	30	RN	BN	Y
21	PH	2	T	3	Y	0	N	S	C	20	53	RN	BF	Y	20	41	RN	BN	Y
21	PH	3	T	3	Y	0	N	S	C	20	54	RN	BF	Y	60	38	RN	BN	Y
21	PH	4	T	3	Y	0	N	S	C	20	52	RN	BF	Y	40	41	RN	BN	Y
22	PH	2	T	3	Y	7	N	S	C	1.3	32	RN	BB	Y	20	41	RN	BB	Y
22	PH	3	T	3	Y	7	N	S	C	1.3	34	RN	BB	Y	60	45	RN	BB	Y
22	PH	2	T	3	Y	7	N	S	C	5	36	RN	BB	Y	20	41	RN	BB	Y
22	PH	3	T	3	Y	7	N	S	C	5	40	RN	BB	Y	60	49	RN	BB	Y
22	PH	2	T	3	Y	7	N	S	C	10	41	RN	BB	Y	20	42	RN	BB	Y
22	PH	3	T	3	Y	7	N	S	C	10	39	RN	BB	Y	60	44	RN	BB	Y
22	PH	2	T	3	Y	7	N	S	C	20	40	RN	BB	Y	20	41	RN	BB	Y
22	PH	3	T	3	Y	7	N	S	C	20	40	RN	BB	Y	60	46	RN	BB	Y
23	PH	1	T	3	Y	0	N	S	U	1.3	30	RN	BB	Y	10	31	RN	BB	Y
23	PH	2	T	3	Y	0	N	S	U	1.3	32	RN	BB	Y					
23	PH	3	T	3	Y	0	N	S	U	1.3	31	RN	BB	Y					
23	PH	1	T	3	Y	0	N	S	U	5	33	RN	BB	Y					
23	PH	2	T	3	Y	0	N	S	U	5	32	RN	BB	Y	20	35	RN	BB	Y
23	PH	3	T	3	Y	0	N	S	U	5	34	RN	BB	Y					
23	PH	1	T	3	Y	0	N	S	U	10	36	RN	BB	Y					
23	PH	2	T	3	Y	0	N	S	U	10	35	RN	BB	Y					
23	PH	3	T	3	Y	0	N	S	U	10	35	RN	BB	Y					
23	PH	1	T	3	Y	0	N	S	U	20	38	RN	BB	Y					
23	PH	2	T	3	Y	0	N	S	U	20	38	RN	BB	Y					
23	PH	3	T	3	Y	0	N	S	U	20	39	RN	BB	Y	60	40	RN	BB	Y
24	PH	1	T	3	Y	7	N	S	U	1.3	22	RN	BB	Y					
24	PH	2	T	3	Y	7	N	S	U	1.3	30	RN	BB	Y	20	33	RN	BB	Y
24	PH	1	T	3	Y	7	N	S	U	5	32	RN	BB	Y					
24	PH	2	T	3	Y	7	N	S	U	5	30	RN	BB	Y	60	33	RN	BB	Y
24	PH	1	T	3	Y	7	N	S	U	10	32	RN	BB	Y					
24	PH	2	T	3	Y	7	N	S	U	10	34	RN	BB	Y	60	36	RN	BB	Y
24	PH	1	T	3	Y	7	N	S	U	20	35	RN	BB	Y					
24	PH	2	T	3	Y	7	N	S	U	20	34	RN	BB	Y	60	37	RN	BB	Y
25	PH	1	T	3	Y	0	W	H	C	1.3	77	RF	BF	Y	10	2	RF	BF	Y
25	PH	2	T	3	Y	0	W	H	C	1.3	75	RF	BF	Y	20	4	RF	BF	Y
25	PH	3	T	3	Y	0	W	H	C	1.3	74	RF	BF	Y	60	12	RF	BF	Y
25	PH	1	T	3	Y	0	W	H	C	5	67	RF	BF	Y	10	1	RF	BF	Y
25	PH	2	T	3	Y	0	W	H	C	5	78	RF	BF	Y	20	5	RF	BF	Y
25	PH	3	T	3	Y	0	W	H	C	5	78	RF	BF	Y	60	20	RF	BF	Y
25	PH	1	T	3	Y	0	W	H	C	10	74	RF	BF	Y	10	2	RF	BF	Y
25	PH	2	T	3	Y	0	W	H	C	10	78	RF	BF	Y	20	5	RF	BF	Y
25	PH	3	T	3	Y	0	W	H	C	10	77	RF	BF	Y	60	20	RF	BF	Y
25	PH	1	T	3	Y	0	W	H	C	20	83	RF	BF	Y	10	2	RF	BF	Y
25	PH	2	T	3	Y	0	W	H	C	20	77	RF	BF	Y	20	4	RF	BF	Y
25	PH	3	T	3	Y	0	W	H	C	20	82	RF	BF	Y	60	10	RF	BF	Y

26	PH	2	T	3	Y	7	W	H	C	1.3	43	RF	BF	Y	10	2	RF	BF	Y
26	PH	3	T	3	Y	7	W	H	C	1.3	38	RF	BF	Y	60	32	RF	BF	Y
26	PH	1	T	3	Y	7	W	H	C	5	53	RF	BF	Y	10	1	RF	BF	Y
26	PH	2	T	3	Y	7	W	H	C	5	41	RF	BF	Y	20	3	RF	BF	Y
26	PH	3	T	3	Y	7	W	H	C	5	47	RF	BF	Y	60	15	RW	BF	Y
26	PH	1	T	3	Y	7	W	H	C	10	49	RF	BF	Y	10	9	RF	BF	Y
26	PH	2	T	3	Y	7	W	H	C	10	42	RF	BF	Y	20	5	RW	BF	Y
26	PH	3	T	3	Y	7	W	H	C	10	53	RF	BF	Y	60	15	RF	BF	Y
26	PH	1	T	3	Y	7	W	H	C	20	53	RF	BF	Y	10	3	RF	BF	Y
26	PH	2	T	3	Y	7	W	H	C	20	50	RF	BF	Y	20	7	RF	BF	Y
26	PH	3	T	3	Y	7	W	H	C	20	53	RF	BF	Y	60	8	RW	BF	Y
28	PH	1	T	3	Y	7	W	H	U	1.3	39	RF	BF	Y	10	1	RF	BF	Y
28	PH	2	T	3	Y	7	W	H	U	1.3	31	RF	BF	Y	20	3	RF	BF	Y
28	PH	3	T	3	Y	7	W	H	U	1.3	44	RF	BF	Y	61	22	RW	BF	Y
28	PH	1	T	3	Y	7	W	H	U	5	40	RF	BF	Y	10	1	RW	BF	Y
28	PH	2	T	3	Y	7	W	H	U	5	30	RF	BF	Y	20	3	RW	BF	Y
28	PH	3	T	3	Y	7	W	H	U	5	47	RF	BF	Y	60	14	RF	BF	Y
28	PH	1	T	3	Y	7	W	H	U	10	47	RF	BF	Y	10	2	RW	BF	Y
28	PH	2	T	3	Y	7	W	H	U	10	44	RF	BF	Y	20	1	RW	BF	Y
28	PH	3	T	3	Y	7	W	H	U	10	39	RF	BF	Y	60	24	RW	BF	Y
28	PH	1	T	3	Y	7	W	H	U	20	50	RF	BF	Y	10	4	RW	BF	Y
28	PH	2	T	3	Y	7	W	H	U	20	52	RF	BF	Y	20	2	RW	BF	Y
28	PH	3	T	3	Y	7	W	H	U	20	51	RF	BF	Y	60	25	RW	BF	Y
29	PH	1	T	3	Y	0	W	S	C	5	48	RF	BW	Y	10	5	RF	BW	Y
29	PH	2	T	3	Y	0	W	S	C	5	47	RF	BW	Y	20	5	RF	BW	Y
29	PH	3	T	3	Y	0	W	S	C	5	47	RF	BW	Y	60	4	RF	BW	Y
29	PH	1	T	3	Y	0	W	S	C	10	47	RF	BW	Y	10	4	RF	BW	Y
29	PH	2	T	3	Y	0	W	S	C	10	45	RF	BW	Y	20	4	RF	BW	Y
29	PH	3	T	3	Y	0	W	S	C	10	48	RF	BW	Y	60	7	RF	BW	Y
29	PH	1	T	3	Y	0	W	S	C	20	49	RF	BW	Y					
29	PH	2	T	3	Y	0	W	S	C	20	50	RF	BW	Y					
29	PH	3	T	3	Y	0	W	S	C	20	53	RF	BW	Y					
29	PH	1	T	3	Y	0	W	S	C	1.3	49	RF	BW	Y	10	2	RF	BW	Y
29	PH	2	T	3	Y	0	W	S	C	1.3	50	RF	BW	Y	20	3	RF	BW	Y
29	PH	3	T	3	Y	0	W	S	C	1.3	53	RF	BW	Y	60	11	RF	BW	Y
30	PH	1	T	3	Y	7	W	S	C	1.3	26	RF	BF	Y	10	14	RF	BW	Y
30	PH	2	T	3	Y	7	W	S	C	1.3	27	RF	BF	Y	20	17	RF	BW	Y
30	PH	3	T	3	Y	7	W	S	C	1.3	21	RF	BF	Y	60	36	RF	BW	Y
30	PH	1	T	3	Y	7	W	S	C	5	27	RF	BF	Y	10	21	RF	BW	Y
30	PH	2	T	3	Y	7	W	S	C	5	29	RF	BF	Y	20	17	RF	BW	Y
30	PH	3	T	3	Y	7	W	S	C	5	29	RF	BF	Y	60	37	RF	BW	Y
30	PH	1	T	3	Y	7	W	S	C	10	27	RF	BF	Y	10	7	RF	BW	Y
30	PH	2	T	3	Y	7	W	S	C	10	24	RF	BF	Y	20	19	RF	BW	Y
30	PH	3	T	3	Y	7	W	S	C	10	32	RF	BF	Y	60	26	RF	BW	Y
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31	PH	2	T	3	Y	0	W	S	U	1.3	33	RF	BW	Y	20	1	RF	BW	Y
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31	PH	2	T	3	Y	0	W	S	U	5	38	RF	BW	Y	20	2	RF	BW	Y
31	PH	3	T	3	Y	0	W	S	U	5	38	RF	BW	Y	60	6	RF	BW	Y
31	PH	1	T	3	Y	0	W	S	U	10	36	RF	BW	Y	10	1	RF	BW	Y
31	PH	2	T	3	Y	0	W	S	U	10	39	RF	BW	Y	20	3	RF	BW	Y
31	PH	3	T	3	Y	0	W	S	U	10	39	RF	BW	Y	60	4	RF	BW	Y
31	PH	1	T	3	Y	0	W	S	U	20	30	RF	BW	Y	10	3	RF	BW	Y
31	PH	2	T	3	Y	0	W	S	U	20	36	RF	BW	Y	20	2	RF	BW	Y

31	PH	3	T	3	Y	0	H	S	U	20	40	RF	BN	Y					
32	PH	1	T	3	Y	7	W	S	U	1.3	22	RN	BN	Y	10	17	BN	Y	
32	PH	2	T	3	Y	7	W	S	U	1.3	24	RN	BN	Y	20	11	RN	BN	Y
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32	PH	1	T	3	Y	7	W	S	U	5	25	RN	BN	Y	10	11	RN	BN	Y
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32	PH	2	T	3	Y	7	W	S	U	20	31	RN	BN	Y	20	8	RN	BN	Y
32	PH	3	T	3	Y	7	W	S	U	20	31	RN	BN	Y	60	9	RN	BN	Y
31	HT	1	T	3	N	0	N	H	C	1.3	83	RW	BN	Y	10	3	RU	BN	Y
31	HT	2	T	3	N	0	N	H	C	1.3	79	RW	BN	Y	20	5	RW	BN	Y
31	HT	3	T	3	N	0	N	H	C	1.3	64	RW	BN	Y	60	17	RW	BN	Y
31	HT	1	T	3	N	0	N	H	C	5	89	RW	BN	Y	10	2	RW	BN	Y
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31	HT	1	T	3	N	0	N	H	C	10	91	RW	BN	Y	10	3	RW	BN	Y
31	HT	2	T	3	N	0	N	H	C	10	91	RW	BN	Y	20	4	RW	BN	Y
31	HT	3	T	3	N	0	N	H	C	10	83	RW	BN	Y	60	12	RW	BN	Y
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31	HT	3	T	3	N	0	N	H	C	20	68	RW	BN	Y	60	10	RW	BN	Y
32	HT	1	T	3	N	7	N	H	C	1.3	56	RW	BN	Y	10	7	RW	BN	Y
32	HT	2	T	3	N	7	N	H	C	1.3	72	RW	BN	Y	20	39	RW	BN	Y
32	HT	3	T	3	N	7	N	H	C	1.3	57	RW	BN	Y	60	33	RW	BN	Y
32	HT	1	T	3	N	7	N	H	C	5	61	RW	BN	Y	10	3	RW	BN	Y
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32	HT	2	T	3	N	7	N	H	C	10	60	RW	BN	Y	60	53	RW	BN	Y
32	HT	3	T	3	N	7	N	H	C	20	70	RW	BN	Y	10	7	RW	BN	Y
32	HT	2	T	3	N	7	N	H	C	20	64	RW	BN	Y	20	7	RW	BN	Y
32	HT	3	T	3	N	7	N	H	C	20	68	RW	BN	Y	60	14	RW	BN	Y
33	HT	1	T	3	N	0	N	H	U	1.3	53	RF	BN	Y	10	3	RF	BN	Y
33	HT	2	T	3	N	0	N	H	U	1.3	46	RF	BN	Y	20	5	RF	BN	Y
33	HT	3	T	3	N	0	N	H	U	1.3	47	RF	BN	Y	60	37	RF	BN	Y
33	HT	1	T	3	N	0	N	H	U	5	58	RF	BN	Y	10	11	RF	BN	Y
33	HT	2	T	3	N	0	N	H	U	5	55	RF	BN	Y	20	33	RF	BN	Y
33	HT	3	T	3	N	0	N	H	U	5	55	RF	BN	Y	60	20	RF	BN	Y
33	HT	1	T	3	N	0	N	H	U	10	57	RF	BN	Y	10	2	RF	BN	Y
33	HT	2	T	3	N	0	N	H	U	10	59	RF	BN	Y	20	6	RF	BN	Y
33	HT	3	T	3	N	0	N	H	U	10	65	RF	BN	Y	60	11	RF	BN	Y
33	HT	1	T	3	N	0	N	H	U	20	59	RF	BN	Y	10	2	RF	BN	Y
33	HT	2	T	3	N	0	N	H	U	20	62	RF	BN	Y	20	19	RF	BN	Y
33	HT	3	T	3	N	0	N	H	U	20	53	RF	BN	Y	60	8	RF	BN	Y
34	HT	1	T	3	N	7	N	H	U	1.3	43	RW	BN	Y	10	7	RW	BN	Y
34	HT	2	T	3	N	7	N	H	U	1.3	37	RW	BN	Y	20	5	RW	BN	Y
34	HT	3	T	3	N	7	N	H	U	1.3	32	RW	BN	Y	60	43	RW	BN	Y
34	HT	1	T	3	N	7	N	H	U	5	42	RW	BN	Y	10	15	RW	BN	Y
34	HT	2	T	3	N	7	N	H	U	5	44	RW	BN	Y	20	4	RW	BN	Y
34	HT	3	T	3	N	7	N	H	U	5	48	RW	BN	Y	60	11	RW	BN	Y
34	HT	1	T	3	N	7	N	H	U	10	47	RW	BN	Y	10	6	RW	BN	Y
34	HT	2	T	3	N	7	N	H	U	10	54	RW	BN	Y	20	8	RW	BN	Y
34	HT	3	T	3	N	7	N	H	U	10	45	RW	BN	Y	60	13	RW	BN	Y
34	HT	1	T	3	N	7	N	H	U	20	52	RW	BN	Y	10	5	RW	BN	Y

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04	HT	2	T	3	N	7	N	H	U	20	48	RW	BN	Y	20	5	RW	BN	Y
04	HT	3	T	3	N	7	N	H	U	20	59	RW	BN	Y	60	13	RW	BN	Y
05	HT	1	T	3	N	0	N	S	C	1.3	44	RW	BN	Y	10	34	RW	BN	Y
05	HT	2	T	3	N	0	N	S	C	1.3	77	RW	BN	Y	20	12	RW	BN	Y
05	HT	3	T	3	N	0	N	S	C	1.3	78	RW	BN	Y	60	23	RW	BN	Y
05	HT	1	T	3	N	0	N	S	C	5	86	RW	BN	Y	10	2	RW	BN	Y
05	HT	2	T	3	N	0	N	S	C	5	75	RW	BN	Y	20	5	RW	BN	Y
05	HT	3	T	3	N	0	N	S	C	5	83	RW	BN	Y	60	13	RW	BN	Y
05	HT	1	T	3	N	0	N	S	C	10	67	RW	BN	Y	10	2	RW	BN	Y
05	HT	2	T	3	N	0	N	S	C	10	63	RW	BN	Y	20	5	RW	BN	Y
05	HT	3	T	3	N	0	N	S	C	10	76	RW	BN	Y	60	10	RW	BN	Y
05	HT	1	T	3	N	0	N	S	C	20	81	RW	BN	Y	10	2	RW	BN	Y
05	HT	2	T	3	N	0	N	S	C	20	69	RW	BN	Y	20	4	RW	BN	Y
05	HT	3	T	3	N	0	N	S	C	20	83	RW	BN	Y	60	8	RW	BN	Y
06	HT	1	T	3	N	7	N	S	C	1.3	61	RW	BN	Y	10	3	RW	BN	Y
06	HT	2	T	3	N	7	N	S	C	1.3	62	RW	BN	Y	20	10	RW	BN	Y
06	HT	3	T	3	N	7	N	S	C	1.3	53	RW	BN	Y	60	18	RW	BN	Y
06	HT	1	T	3	N	7	N	S	C	5	56	RW	BN	Y	10	22	RW	BN	Y
06	HT	2	T	3	N	7	N	S	C	5	73	RW	BN	Y	20	6	RW	BN	Y
06	HT	3	T	3	N	7	N	S	C	5	61	RW	BN	Y	60	15	RW	BN	Y
06	HT	1	T	3	N	7	N	S	C	10	71	RW	BN	Y	10	3	RW	BN	Y
06	HT	2	T	3	N	7	N	S	C	10	59	RW	BN	Y	20	12	RW	BN	Y
06	HT	3	T	3	N	7	N	S	C	10	67	RW	BN	Y	60	15	RW	BN	Y
06	HT	1	T	3	N	7	N	S	C	20	82	RW	BN	Y	10	12	RW	BN	Y
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06	HT	3	T	3	N	7	N	S	C	20	74	RW	BN	Y	60	23	RW	BN	Y
17	HT	1	T	3	Y	0	N	H	C	1.3	68	RW	BN	Y	10	3	RW	BN	Y
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17	HT	1	T	3	Y	0	N	H	C	20	70	RW	BN	Y	10	2	RW	BN	Y
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18	HT	2	T	3	Y	7	N	H	C	1.3	51	RW	BN	Y	20	7	RW	BN	Y
18	HT	3	T	3	Y	7	N	H	C	1.3	53	RW	BN	Y	60	29	RW	BN	Y
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18	HT	3	T	3	Y	7	N	H	C	10	68	RW	BN	Y	60	11	RW	BN	Y
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19	HT	3	T	3	Y	0	N	H	U	1.3	31	RW	BN	Y	60	41	RW	BN	Y
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19	HT	1	T	3	Y	0	N	H	U	10	61	RW	BN	Y	10	6	RW	BN	Y
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19	HT	2	T	3	Y	0	N	H	U	1.3	47	RW	BN	Y	20	22	RW	BN	Y
19	HT	3	T	3	Y	0	N	H	U	1.3	31	RW	BN	Y	60	41	RW	BN	Y
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19	HT	1	T	3	Y	0	N	H	U	10	61	RW	BN	Y	10	6	RW	BN	Y
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19	HT	3	T	3	Y	0	N	H	U	10	51	RW	BN	Y	60	16	RW	BN	Y
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20	HT	1	T	3	Y	7	N	H	U	1.3	22	RF	BN	Y	10	2	RW	BN	Y
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20	HT	2	T	3	Y	7	N	H	U	5	45	RF	BN	Y	20	5	RW	BN	Y
20	HT	3	T	3	Y	7	N	H	U	5	52	RF	BN	Y	60	14	RW	BN	Y
20	HT	1	T	3	Y	7	N	H	U	10	40	RF	BN	Y	10	2	RW	BN	Y
20	HT	2	T	3	Y	7	N	H	U	10	36	RF	BN	Y	20	8	RW	BN	Y
20	HT	3	T	3	Y	7	N	H	U	10	31	RF	BN	Y	60	34	RW	BN	Y
20	HT	1	T	3	Y	7	N	H	U	20	36	RF	BN	Y	10	1	RW	BN	Y
20	HT	2	T	3	Y	7	N	H	U	20	44	RF	BN	Y	20	3	RW	BN	Y
20	HT	3	T	3	Y	7	N	H	U	20	51	RF	BN	Y	60	19	RW	BN	Y
21	HT	1	T	3	Y	0	N	S	C	1.3	32	RW	BN	Y	10	31	RW	BN	Y
21	HT	2	T	3	Y	0	N	S	C	1.3	54	RW	BN	Y	20	15	RW	BN	Y
21	HT	3	T	3	Y	0	N	S	C	1.3	56	RW	BN	Y	60	28	RW	BN	Y
21	HT	1	T	3	Y	0	N	S	C	5	73	RW	BN	Y	10	4	RW	BN	Y
21	HT	2	T	3	Y	0	N	S	C	5	66	RW	BN	Y	20	6	RW	BN	Y
21	HT	3	T	3	Y	0	N	S	C	5	68	RW	BN	Y	60	16	RW	BN	Y
21	HT	1	T	3	Y	0	N	S	C	10	70	RW	BN	Y	10	2	RW	BN	Y
21	HT	2	T	3	Y	0	N	S	C	10	71	RW	BN	Y	20	5	RW	BN	Y
21	HT	3	T	3	Y	0	N	S	C	10	63	RW	BN	Y	60	20	RW	BN	Y
21	HT	1	T	3	Y	0	N	S	C	20	67	RW	BN	Y	10	2	RW	BN	Y
21	HT	2	T	3	Y	0	N	S	C	20	71	RW	BN	Y	20	5	RW	BN	Y
21	HT	3	T	3	Y	0	N	S	C	20	70	RW	BN	Y	60	27	RW	BN	Y
22	HT	1	T	3	Y	7	N	S	C	1.3	52	RF	BN	Y	10	19	RW	BN	Y
22	HT	2	T	3	Y	7	N	S	C	1.3	42	RF	BN	Y	20	12	RW	BN	Y
22	HT	3	T	3	Y	7	N	S	C	1.3	57	RF	BN	Y	60	31	RW	BN	Y
22	HT	1	T	3	Y	7	N	S	C	5	59	RW	BN	Y	10	4	RW	BN	Y
22	HT	2	T	3	Y	7	N	S	C	5	56	RW	BN	Y	20	7	RW	BN	Y
22	HT	3	T	3	Y	7	N	S	C	5	54	RW	BN	Y	60	25	RW	BN	Y
22	HT	1	T	3	Y	7	N	S	C	10	59	RW	BN	Y	10	4	RW	BN	Y
22	HT	2	T	3	Y	7	N	S	C	10	63	RW	BN	Y	20	8	RW	BN	Y
22	HT	3	T	3	Y	7	N	S	C	10	65	RW	BN	Y	60	21	RW	BN	Y
22	HT	1	T	3	Y	7	N	S	C	20	73	RW	BN	Y	10	15	RW	BN	Y
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25	HT	2	T	3	Y	0	W	H	C	1.3	34	RF	BF	Y	20	15	RF	BF	Y
25	HT	3	T	3	Y	0	W	H	C	1.3	53	RF	BF	Y	60	20	RF	BF	Y
25	HT	1	T	3	Y	0	W	H	C	5	69	RF	BF	Y	10	3	RF	BF	Y
25	HT	2	T	3	Y	0	W	H	C	5	64	RF	BF	Y	20	3	RF	BF	Y
25	HT	3	T	3	Y	0	W	H	C	5	49	RF	BF	Y	60	21	RF	BF	Y
25	HT	1	T	3	Y	0	W	H	C	10	55	RF	BF	Y	20	6	RF	BF	Y
25	HT	2	T	3	Y	0	W	H	C	10	58	RF	BF	Y	60	16	RF	BF	Y
25	HT	3	T	3	Y	0	W	H	C	20	44	RF	BF	Y	10	7	RF	BF	Y
25	HT	1	T	3	Y	0	W	H	C	20	46	RF	BF	Y	20	4	RF	BF	Y
25	HT	2	T	3	Y	0	W	H	C	20	44	RF	BF	Y	60	15	RF	BF	Y

29	HT	2	T	3	Y	0	W	S	C	20	50	RF	BF	Y	60	13	RF	BF	Y
01	TS	1	T	3	N	0	N	H	C	1.3	123	RF	BN	Y	10	35	RW	BN	Y
01	TS	2	T	3	N	0	N	H	C	1.3	121	RF	BN	Y	20	35	RW	BN	Y
01	TS	3	T	3	N	0	N	H	C	1.3	122	RF	BN	Y	60	82	RW	BN	Y
01	TS	1	T	3	N	0	N	H	C	5	122	RF	BN	Y	10	41	RW	BN	Y
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01	TS	1	T	3	N	0	N	H	C	10	119	RF	BN	Y	10	11	RW	BN	Y
01	TS	2	T	3	N	0	N	H	C	10	123	RF	BN	Y	20	39	RW	BN	Y
01	TS	3	T	3	N	0	N	H	C	10	122	RF	BN	Y	60	68	RW	BN	Y
01	TS	1	T	3	N	0	N	H	C	20	124	RF	BN	Y	10	30	RW	BN	Y
01	TS	2	T	3	N	0	N	H	C	20	126	RF	BN	Y	20	37	RW	BN	Y
01	TS	3	T	3	N	0	N	H	C	20	124	RF	BN	Y	60	75	RW	BN	Y
02	TS	1	T	3	N	7	N	H	C	1.3	79	RF	BN	Y					
02	TS	2	T	3	N	7	N	H	C	1.3	77	RW	BN	Y	20	18	RH	BN	Y
02	TS	3	T	3	N	7	N	H	C	1.3	90	RW	BN	Y	60	74	RW	BN	Y
02	TS	1	T	3	N	7	N	H	C	5	78	RW	BN	Y	10	33	RW	BN	Y
02	TS	2	T	3	N	7	N	H	C	5	80	RW	BN	Y	20	10	RH	BN	Y
02	TS	3	T	3	N	7	N	H	C	5	84	RW	BN	Y	60	37	RW	BN	Y
02	TS	1	T	3	N	7	N	H	C	10	75	RW	BN	Y	10	48	RW	BN	Y
02	TS	2	T	3	N	7	N	H	C	10	93	RW	BN	Y	20	6	RW	BN	Y
02	TS	3	T	3	N	7	N	H	C	10	75	RW	BN	Y	60	48	RW	BN	Y
02	TS	1	T	3	N	7	N	H	C	20	88	RW	BN	Y	10	10	RW	BN	Y
02	TS	2	T	3	N	7	N	H	C	20	87	RW	BN	Y	20	15	RW	BN	Y
02	TS	3	T	3	N	7	N	H	C	20	81	RW	BN	Y	60	29	RW	BN	Y
03	TS	1	T	3	N	0	N	H	U	1.3	93	RW	BF	Y	10	33	RW	BF	Y
03	TS	2	T	3	N	0	N	H	U	1.3	96	RW	BF	Y	20	40	RW	BF	Y
03	TS	3	T	3	N	0	N	H	U	1.3	93	RW	BF	Y	60	62	RW	BF	Y
03	TS	1	T	3	N	0	N	H	U	5	100	RW	BF	Y	10	30	RW	BF	Y
03	TS	2	T	3	N	0	N	H	U	5	95	RW	BF	Y	20	41	RW	BF	Y
03	TS	3	T	3	N	0	N	H	U	5	94	RW	BF	Y	60	53	RW	BF	Y
03	TS	1	T	3	N	0	N	H	U	10	95	RW	BF	Y	10	28	RH	BF	Y
03	TS	2	T	3	N	0	N	H	U	10	94	RW	BF	Y	20	42	RW	BF	Y
03	TS	3	T	3	N	0	N	H	U	10	97	RW	BF	Y	60	47	RH	BF	Y
03	TS	1	T	3	N	0	N	H	U	20	97	RW	BF	Y	10	17	RW	BF	Y
03	TS	2	T	3	N	0	N	H	U	20	96	RW	BF	Y	20	29	RW	BF	Y
03	TS	3	T	3	N	0	N	H	U	20	95	RW	BF	Y	60	54	RW	BF	Y
04	TS	1	T	3	N	7	N	H	U	1.3	69	RW	BF	Y	10	11	RW	BF	Y
04	TS	2	T	3	N	7	N	H	U	1.3	72	RW	BF	Y	20	46	RW	BF	Y
04	TS	3	T	3	N	7	N	H	U	1.3	74	RW	BF	Y	60	56	RW	BF	Y
04	TS	1	T	3	N	7	N	H	U	5	78	RW	BF	Y	10	6	RW	BF	Y
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04	TS	3	T	3	N	7	N	H	U	5	75	RW	BF	Y	60	35	RW	BF	Y
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04	TS	3	T	3	N	7	N	H	U	20	82	RW	BF	Y	60	45	RW	BF	Y
05	TS	1	T	3	N	0	N	S	C	1.3	77	RW	BF	Y	10	5	RW	BF	Y
05	TS	2	T	3	N	0	N	S	C	1.3	73	RW	BF	Y	20	14	RW	BF	Y
05	TS	3	T	3	N	0	N	S	C	1.3	72	RW	BF	Y	60	37	RW	BF	Y
05	TS	4	T	3	N	0	N	S	C	1.3	77	RW	BF	Y	10	64	RW	BF	Y
05	TS	1	T	3	N	0	N	S	C	10	74	RW	BF	Y	10	6	RW	BF	Y
05	TS	2	T	3	N	0	N	S	C	10	78	RW	BF	Y	20	17	RW	BF	Y
05	TS	3	T	3	N	0	N	S	C	10	78	RW	BF	Y	60	35	RW	BF	Y
05	TS	1	T	3	N	0	N	S	C	20	78	RW	BF	Y	10	7	RW	BF	Y
05	TS	2	T	3	N	0	N	S	C	20	81	RW	BF	Y	20	8	RW	BF	Y



THIS PAGE IS BEST QUALITY PRACTICABLE  
FROM COPY FURNISHED TO DDC

05	TS	3	T	3	N	0	N	S	C	20	75	RW	BF	Y	60	32	RW	BN	Y
05	TS	4	T	3	N	0	N	S	C	20	75	RW	BF	Y	60	72	RW	BN	Y
06	TS	1	T	3	N	7	N	S	C	1.3	55	RW	BN	Y	10	25	RW	BN	Y
06	TS	2	T	3	N	7	N	S	C	1.3	62	RW	BN	Y	20	31	RW	BN	Y
06	TS	3	T	3	N	7	N	S	C	1.3	61	RW	BN	Y	60	46	RW	BN	Y
06	TS	1	T	3	N	7	N	S	C	5	56	RW	BN	Y	10	27	RW	BN	Y
06	TS	2	T	3	N	7	N	S	C	5	64	RW	BN	Y	20	17	RW	BN	Y
06	TS	3	T	3	N	7	N	S	C	5	63	RW	BN	Y	60	34	RW	BN	Y
06	TS	1	T	3	N	7	N	S	C	10	60	RW	BN	Y	10	30	RW	BN	Y
06	TS	2	T	3	N	7	N	S	C	10	63	RW	BN	Y	20	10	RW	BN	Y
06	TS	3	T	3	N	7	N	S	C	10	65	RW	BN	Y	60	31	RW	BN	Y
06	TS	1	T	3	N	7	N	S	C	20	66	RW	BN	Y	10	3	RW	BN	Y
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06	TS	3	T	3	N	7	N	S	C	20	63	RW	BN	Y	60	31	RW	BN	Y
17	TS	1	T	3	Y	0	N	H	C	1.3	97	RW	BN	Y	10	8	RW	BN	Y
17	TS	2	T	3	Y	0	N	H	C	1.3	104	RW	BN	Y	20	12	RW	BN	Y
17	TS	3	T	3	Y	0	N	H	C	1.3	105	RW	BN	Y	60	76	RW	BN	Y
17	TS	1	T	3	Y	0	N	H	C	5	113	RW	BN	Y	10	7	RW	BN	Y
17	TS	2	T	3	Y	0	N	H	C	5	108	RW	BN	Y	20	20	RW	BN	Y
17	TS	3	T	3	Y	0	N	H	C	5	107	RW	BN	Y	60	52	RW	BN	Y
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17	TS	2	T	3	Y	0	N	H	C	10	113	RW	BN	Y	20	17	RW	BN	Y
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17	TS	1	T	3	Y	0	N	H	C	20	112	RW	BN	Y	10	10	RW	BN	Y
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18	TS	1	T	3	Y	7	N	H	C	10	64	RF	BN	Y	10	14	RF	BN	Y
18	TS	2	T	3	Y	7	N	H	C	10	62	RF	BN	Y	20	43	RF	BN	Y
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18	TS	2	T	3	Y	7	N	H	C	20	80	RF	BN	Y	20	13	RF	BN	Y
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19	TS	1	T	3	Y	0	N	H	U	1.3	45	RW	BN	Y	10	18	RW	BN	Y
19	TS	2	T	3	Y	0	N	H	U	1.3	63	RW	BN	Y	20	20	RW	BN	Y
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19	TS	3	T	3	Y	0	N	H	U	10	68	RW	BN	Y	60	40	RW	BN	Y
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19	TS	3	T	3	Y	0	N	H	U	20	92	RW	BN	Y	60	57	RW	BN	Y
20	TS	1	T	3	Y	7	N	H	U	1.3	61	RW	BN	Y	10	0	RW	BN	Y
20	TS	2	T	3	Y	7	N	H	U	1.3	66	RW	BN	Y	20	17	RW	BN	Y
20	TS	3	T	3	Y	7	N	H	U	1.3	64	RW	BN	Y	60	57	RW	BN	Y
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20	TS	2	T	3	Y	7	N	H	U	5	70	RW	BN	Y	20	13	RW	BN	Y
20	TS	3	T	3	Y	7	N	H	U	5	73	RW	BN	Y	60	42	RW	BN	Y
20	TS	1	T	3	Y	7	N	H	U	10	72	RW	BN	Y	10	3	RW	BN	Y
20	TS	2	T	3	Y	7	N	H	U	10	69	RW	BN	Y	20	12	RW	BN	Y

20	TS	3	T	3	Y	7	N	H	U	10	71	RW	BN	Y	60	61	RW	BN	Y
20	TS	1	T	3	Y	7	N	H	U	20	74	RW	BN	Y	10	3	RW	BN	Y
20	TS	2	T	3	Y	7	N	H	U	20	68	RW	BN	Y	20	8	RW	BN	Y
20	TS	3	T	3	Y	7	N	H	U	20	75	RW	BN	Y	60	37	RW	BN	Y
21	TS	1	T	3	Y	0	N	S	C	1.3	70	RW	BF	Y	10	5	RW	BF	Y
21	TS	2	T	3	Y	0	N	S	C	1.3	68	RW	BF	Y	20	8	RW	BF	Y
21	TS	3	T	3	Y	0	N	S	C	1.3	68	RW	BF	Y	60	25	RW	BF	Y
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21	TS	1	T	3	Y	0	N	S	C	20	71	RW	BF	Y	10	4	RW	BF	Y
21	TS	2	T	3	Y	0	N	S	C	20	72	RW	BF	Y	20	8	RW	BF	Y
21	TS	3	T	3	Y	0	N	S	C	20	72	RW	BF	Y	60	24	RW	BF	Y
22	TS	1	T	3	Y	7	N	S	C	1.3	50	RW	BF	Y	10	17	RW	BF	Y
22	TS	2	T	3	Y	7	N	S	C	1.3	53	RW	BF	Y	20	33	RW	BF	Y
22	TS	3	T	3	Y	7	N	S	C	1.3	51	RW	BF	Y	60	37	RW	BF	Y
22	TS	1	T	3	Y	7	N	S	C	5	60	RW	BF	Y	10	6	RW	BF	Y
22	TS	2	T	3	Y	7	N	S	C	5	59	RW	BF	Y	20	12	RW	BF	Y
22	TS	3	T	3	Y	7	N	S	C	5	57	RW	BF	Y	60	48	RW	BF	Y
22	TS	1	T	3	Y	7	N	S	C	10	61	RW	BF	Y	10	2	RW	BF	Y
22	TS	2	T	3	Y	7	N	S	C	10	59	RW	BF	Y	20	8	RW	BF	Y
22	TS	3	T	3	Y	7	N	S	C	10	57	RW	BF	Y	60	33	RW	BF	Y
22	TS	1	T	3	Y	7	N	S	C	20	65	RW	BF	Y	10	5	RW	BF	Y
22	TS	2	T	3	Y	7	N	S	C	20	61	RW	BF	Y	20	8	RW	BF	Y
22	TS	3	T	3	Y	7	N	S	C	20	55	RW	BF	Y	60	41	RW	BF	Y
25	TS	1	T	3	Y	0	W	H	C	1.3	112	RW	BF	Y	10	3	RW	BF	Y
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25	TS	1	T	3	Y	0	W	H	C	5	115	RW	BF	Y					
25	TS	2	T	3	Y	0	W	H	C	5	116	RW	BF	Y					
25	TS	3	T	3	Y	0	W	H	C	5	114	RW	BF	Y	60	13	RW	BF	Y
25	TS	1	T	3	Y	0	W	H	C	10	117	RW	BF	Y	10	5	RW	BF	Y
25	TS	2	T	3	Y	0	W	H	C	10	113	RW	BF	Y	20	5	RW	BF	Y
25	TS	3	T	3	Y	0	W	H	C	10	110	RW	BF	Y	60	16	RW	BF	Y
25	TS	1	T	3	Y	0	W	H	C	20	117	RW	BF	Y					
25	TS	2	T	3	Y	0	W	H	C	20	119	RW	BF	Y					
25	TS	3	T	3	Y	0	W	H	C	20	112	RW	BF	Y	60	17	RW	BF	Y
29	TS	1	T	3	Y	0	W	S	C	1.3	93	RW	BF	Y	10	5	RW	BF	Y
29	TS	2	T	3	Y	0	W	S	C	1.3	54	RW	BF	Y	60	61	RW	BF	Y
29	TS	1	T	3	Y	0	W	S	C	5	62	RW	BF	Y	10	7	RW	BF	Y
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01	TW	1	T	3	N	0	N	H	C	20	119	RW	BN	Y	10	3	RW	BN	Y

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FROM COPY FURNISHED TO DDC

01	TH	2	T	3	N	0	N	H	C	20	117	RW	BN	Y	20	7	RW	BN	Y
01	TH	3	T	3	N	0	N	H	C	20	117	RW	BN	Y	60	32	RW	BN	Y
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06	TH	3	T	3	N	7	N	S	C	5	51	RW	BN	Y	60	37	RW	BN	Y
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06	TW	2	T	3	N	7	N	S	C	10	57	RW	BN	Y	60	64	RW	BN	Y
06	TW	1	T	3	N	7	N	S	C	20	62	RW	BN	Y	10	3	RW	BN	Y
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18	TW	2	T	3	Y	7	N	H	C	1.3	38	RW	BN	Y	20	13	RW	BN	Y
18	TW	3	T	3	Y	7	N	H	C	1.3	43	RW	BN	Y	60	64	RW	BN	Y
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26	TW	3	T	3	Y	7	W	H	C	20	48	RF	BF	Y	60	29	RF	BF	Y
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01	TX	2	T	3	Y	0	N	H	C	1.3103	80	RF	BN	Y	20	92	RF	BN	N

01	TX	3	Y	3	N	0	N	H	C	1.3	102	RN	00	Y	60	85	RN	BN	N
01	TX	1	Y	3	N	0	N	H	C	5	103	RN	00	Y	10	90	RN	BN	N
01	TX	2	Y	3	N	0	N	H	C	5	104	RN	00	Y	20	84	RN	BN	N
01	TX	3	Y	3	N	0	N	H	C	5	104	RN	00	Y	60	87	RN	BN	N
01	TX	1	Y	3	N	0	N	H	C	10	102	RN	00	Y	10	82	RN	BN	N
01	TX	2	Y	3	N	0	N	H	C	10	102	RN	00	Y	20	88	RN	BN	N
01	TX	3	Y	3	N	0	N	H	C	10	102	RN	00	Y	60	83	RN	BN	N
01	TX	1	Y	3	N	0	N	H	C	20	105	RN	00	Y	10	88	RN	BN	N
01	TX	2	Y	3	N	0	N	H	C	20	103	RN	00	Y	20	93	RN	BN	N
01	TX	3	Y	3	N	0	N	H	C	20	103	RN	00	Y	60	87	RN	BN	N
02	TX	1	Y	3	N	7	N	H	C	1.3	85	RF	00	Y	60	59	RF	00	Y
02	TX	1	Y	3	N	7	N	H	C	5	103	RF	00	Y	20	31	RF	00	Y
02	TX	1	Y	3	N	7	N	H	C	20	104	RF	00	Y	60	33	RF	00	Y
02	TX	2	Y	3	N	7	N	H	C	20	104	RF	00	Y	60	28	RF	00	Y
02	TX	3	Y	3	N	7	N	H	C	20	101	RF	00	Y	20	38	RF	00	Y
03	TX	1	Y	3	N	0	N	H	U	1.3	58	RF	00	Y	10	8	RF	00	Y
03	TX	2	Y	3	N	0	N	H	U	1.3	57	RF	00	Y	20	9	RF	00	Y
03	TX	3	Y	3	N	0	N	H	U	1.3	56	RF	00	Y	60	14	RF	00	Y
03	TX	1	Y	3	N	0	N	H	U	5	55	RF	00	Y	10	8	RF	00	Y
03	TX	2	Y	3	N	0	N	H	U	5	58	RF	00	Y	20	10	RF	00	Y
03	TX	3	Y	3	N	0	N	H	U	5	57	RF	00	Y	60	13	RF	00	Y
03	TX	1	Y	3	N	0	N	H	U	10	55	RF	00	Y	10	7	RF	00	Y
03	TX	2	Y	3	N	0	N	H	U	10	57	RF	00	Y	20	7	RF	00	Y
03	TX	3	Y	3	N	0	N	H	U	10	59	RF	00	Y	60	9	RF	00	Y
03	TX	1	Y	3	N	0	N	H	U	20	56	RF	00	Y	10	8	RF	00	Y
03	TX	2	Y	3	N	0	N	H	U	20	55	RF	00	Y	20	4	RF	00	Y
03	TX	3	Y	3	N	0	N	H	U	20	57	RF	00	Y	60	8	RF	00	Y
04	TX	1	Y	3	N	7	N	H	U	1.3	45	RF	00	Y	10	8	RF	00	Y
04	TX	2	Y	3	N	7	N	H	U	1.3	47	RF	00	Y	20	17	RF	00	Y
04	TX	3	Y	3	N	7	N	H	U	1.3	46	RF	00	Y	60	15	RF	00	Y
04	TX	1	Y	3	N	7	N	H	U	5	45	RF	00	Y	10	12	RF	00	Y
04	TX	2	Y	3	N	7	N	H	U	5	47	RF	00	Y	20	16	RF	00	Y
04	TX	3	Y	3	N	7	N	H	U	5	47	RF	00	Y	60	13	RF	00	Y
04	TX	1	Y	3	N	7	N	H	U	10	50	RF	00	Y	10	7	RF	00	Y
04	TX	2	Y	3	N	7	N	H	U	10	49	RF	00	Y	20	17	RF	00	Y
04	TX	3	Y	3	N	7	N	H	U	10	51	RF	00	Y	60	13	RF	00	Y
04	TX	1	Y	3	N	7	N	H	U	20	51	RF	00	Y	10	10	RF	00	Y
04	TX	2	Y	3	N	7	N	H	U	20	52	RF	00	Y	20	9	RF	00	Y
04	TX	3	Y	3	N	7	N	H	U	20	47	RF	00	Y	60	21	RF	00	Y
05	TX	1	Y	3	N	0	N	S	C	1.3	68	RN	00	Y	10	56	RN	BN	N
05	TX	2	Y	3	N	0	N	S	C	1.3	67	RN	00	Y	20	55	RN	BN	N
05	TX	3	Y	3	N	0	N	S	C	1.3	67	RN	00	Y	60	58	RN	BN	N
05	TX	1	Y	3	N	0	N	S	C	20	67	RN	00	Y	10	58	RN	BN	N
05	TX	2	Y	3	N	0	N	S	C	20	68	RN	00	Y	20	55	RN	BN	N
05	TX	3	Y	3	N	0	N	S	C	20	67	RN	00	Y	60	58	RN	BN	N
06	TX	1	Y	3	N	7	N	S	C	1.3	60	RF	00	Y	20	59	RF	00	Y
06	TX	2	Y	3	N	7	N	S	C	1.3	63	RF	00	Y	60	52	RF	00	Y
06	TX	1	Y	3	N	7	N	S	C	20	64	RF	00	Y	20	55	RF	00	Y
06	TX	2	Y	3	N	7	N	S	C	20	64	RF	00	Y	60	62	RF	00	Y
17	TX	1	Y	3	Y	0	N	H	C	1.3	103	RN	00	Y					
17	TX	2	Y	3	Y	0	N	H	C	1.3	104	RN	00	Y	60	103	RF	00	Y
17	TX	1	Y	3	Y	0	N	H	C	20	106	RF	00	Y					
17	TX	2	Y	3	Y	0	N	H	C	20	106	RF	00	Y					
18	TX	1	Y	3	Y	7	N	H	C	1.3	84	RF	00	Y	10	16	RF	00	Y
18	TX	2	Y	3	Y	7	N	H	C	1.3	95	RF	00	Y	60	37	RF	00	Y
18	TX	1	Y	3	Y	7	N	H	C	5	94	RF	00	Y	60	37	RF	00	Y
18	TX	1	Y	3	Y	7	N	H	C	10	90	RF	00	Y	10	5	RF	00	Y
18	TX	2	Y	3	Y	7	N	H	C	10	94	RF	00	Y	60	42	RF	00	Y

18	TX	1	T	3	Y	7	N	H	C	20	97	KF	BF	Y	20	13	KF	BF	Y
18	TX	2	T	3	Y	7	N	H	C	20	98	RF	BF	Y	60	32	RF	BF	Y
19	TX	1	T	3	Y	0	N	H	U	1.3	56	RF	BN	Y	10	9	KF	BF	Y
19	TX	2	T	3	Y	0	N	H	U	1.3	55	RF	BN	Y	20	7	FF	BN	Y
19	TX	3	T	3	Y	0	N	H	U	1.3	52	RF	BN	Y	60	11	RF	BN	Y
19	TX	1	T	3	Y	0	N	H	U	20	55	RF	BN	Y	10	8	KF	BN	Y
19	TX	2	T	3	Y	0	N	H	U	20	47	RF	BN	Y	20	13	RF	BN	Y
19	TX	3	T	3	Y	0	N	H	U	20	52	KF	BN	Y	60	11	KF	BN	Y
20	TX	1	T	3	Y	7	N	H	U	1.3	48	KF	BF	Y	10	4	KW	BF	Y
20	TX	2	T	3	Y	7	N	H	U	1.3	47	RF	BF	Y	20	9	KW	BF	Y
20	TX	3	T	3	Y	7	N	H	U	1.3	46	KF	BF	Y	60	17	KW	BF	Y
20	TX	1	T	3	Y	7	N	H	U	5	41	RF	BF	Y	10	13	KW	BF	Y
20	TX	2	T	3	Y	7	N	H	U	5	50	RF	BF	Y	20	10	KW	BF	Y
20	TX	3	T	3	Y	7	N	H	U	5	46	RF	BF	Y	60	14	FW	BF	Y
20	TX	1	T	3	Y	7	N	H	U	10	47	RF	BF	Y	10	8	KW	BF	Y
20	TX	2	T	3	Y	7	N	H	U	10	48	RF	BF	Y	20	5	KW	BF	Y
20	TX	3	T	3	Y	7	N	H	U	10	50	KF	BF	Y	60	12	FW	BF	Y
20	TX	1	T	3	Y	7	N	H	U	20	49	KF	BF	Y	10	6	RW	BF	Y
20	TX	2	T	3	Y	7	N	H	U	20	48	RF	BF	Y	20	9	KW	BF	Y
20	TX	3	T	3	Y	7	N	H	U	20	50	KF	BF	Y	60	13	KW	BF	Y
21	TX	2	T	3	Y	0	N	S	C	1.3	68	FN	BB	Y	20	65	RN	BB	Y
21	TX	3	T	3	Y	0	N	S	C	1.3	67	FW	BB	Y					
21	TX	3	T	3	Y	0	N	S	C	5	68	RW	BB	Y					
21	TX	3	T	3	Y	0	N	S	C	10	69	RW	BB	Y					
21	TX	2	T	3	Y	0	N	S	C	20	69	RW	BB	Y					
21	TX	3	T	3	Y	0	N	S	C	20	68	RW	BB	Y					
22	TX	2	T	3	Y	7	N	S	C	1.3	62	RN	BB	Y	20	60	RN	BB	Y
22	TX	3	T	3	Y	7	N	S	C	1.3	58	RN	BB	Y	60	63	RN	BB	Y
22	TX	2	T	3	Y	7	N	S	C	20	62	RN	BB	Y	20	60	RN	BB	Y
22	TX	3	T	3	Y	7	N	S	C	20	62	RN	BB	Y	60	63	RN	BB	Y
25	TX	1	T	3	Y	0	W	H	C	1.3	83	KW	BF	Y	10	3	KW	BF	Y
25	TX	2	T	3	Y	0	W	H	C	1.3	69	KW	BF	Y	20	3	KW	BF	Y
25	TX	3	T	3	Y	0	W	H	C	1.3	66	KW	BF	Y	60	8	KW	BF	Y
25	TX	1	T	3	Y	0	W	H	C	5	87	KW	BF	Y	10	1	KW	BF	Y
25	TX	2	T	3	Y	0	W	H	C	5	67	KW	BF	Y	20	2	KW	BF	Y
25	TX	3	T	3	Y	0	W	H	C	5	67	RW	BF	Y	60	6	FW	BF	Y
25	TX	1	T	3	Y	0	W	H	C	10	65	RW	BF	Y	10	1	KW	BF	Y
25	TX	2	T	3	Y	0	W	H	C	10	39	RW	BF	Y	20	3	RW	BF	Y
25	TX	3	T	3	Y	0	W	H	C	10	26	RW	BF	Y	60	7	RW	BF	Y
25	TX	1	T	3	Y	0	W	H	C	20	38	RW	BF	Y	10	3	KW	BF	Y
25	TX	2	T	3	Y	0	W	H	C	20	90	RW	BF	Y	20	2	RW	BF	Y
25	TX	3	T	3	Y	0	W	H	C	20	89	RW	BF	Y	60	6	KW	BF	Y
28	TX	1	T	3	Y	7	W	H	U	1.3	13	RF	BF	Y	10	6	KF	BF	Y
28	TX	2	T	3	Y	7	W	H	U	1.3	17	RF	BF	Y	20	4	RF	BF	Y
28	TX	3	T	3	Y	7	W	H	U	1.3	16	KF	BF	Y	60	19	KF	BF	Y
28	TX	1	T	3	Y	7	W	H	U	5	17	KF	BF	Y	10	4	KF	BF	Y
28	TX	2	T	3	Y	7	W	H	U	5	18	KF	BF	Y	20	6	KF	BF	Y
28	TX	3	T	3	Y	7	W	H	U	5	17	RF	BF	Y	60	14	KF	BF	Y
28	TX	1	T	3	Y	7	W	H	U	10	20	KF	BF	Y	10	3	KF	BF	Y
28	TX	2	T	3	Y	7	W	H	U	10	22	KF	BF	Y	20	5	KF	BF	Y
28	TX	3	T	3	Y	7	W	H	U	10	19	KF	BF	Y	60	13	RF	BF	Y
28	TX	1	T	3	Y	7	W	H	U	20	22	RF	BF	Y	10	2	RF	BF	Y
28	TX	2	T	3	Y	7	W	H	U	20	20	KF	BF	Y	20	10	KF	BF	Y
28	TX	3	T	3	Y	7	W	H	U	20	23	KF	BF	Y	60	12	KF	BF	Y
29	TX	1	T	3	Y	0	W	S	C	5	65	FF	BB	Y					
29	TX	2	T	3	Y	0	W	S	C	5	66	RF	BB	Y					
29	TX	3	T	3	Y	0	W	S	C	5	65	FF	BB	Y					
29	TX	1	T	3	Y	0	W	S	C	10	64	RF	BB	Y					

29 TX	2	T	3	Y	0	W	S	C	10	65	RF	08	Y						
29 TX	3	T	3	Y	0	W	S	C	10	66	RF	08	Y						
29 TX	1	T	3	Y	0	W	S	C	20	64	RF	08	Y						
29 TX	2	T	3	Y	0	W	S	C	20	65	RF	08	Y						
29 TX	3	T	3	Y	0	W	S	C	20	66	RF	08	Y						
29 TX	1	T	3	Y	0	W	S	C	1.3	64	RF	08	Y						
29 TX	2	T	3	Y	0	W	S	C	1.3	66	RF	08	Y						
29 TX	3	T	3	Y	0	W	S	C	1.3	67	RF	08	Y						
01PRC	1	T	3	N	0	N	N	C	5	63	RF	08	Y	10	11	RF	08	Y	
01PRC	2	T	3	N	0	N	N	C	5	90	RF	08	Y	60	39	RF	08	Y	
01PRC	1	T	3	N	0	N	N	C	20	66	RF	08	Y	10	17	RF	08	Y	
01PRC	2	T	3	N	0	N	N	C	20	92	RF	08	Y	60	34	RF	08	Y	
02PRC	1	T	3	N	7	N	N	C	5	65	RF	08	Y	10	21	RF	08	Y	
02PRC	2	T	3	N	7	N	N	C	5	37	RF	08	Y	60	54	RF	08	Y	
02PRC	1	T	3	N	7	N	N	C	20	59	RF	08	Y	10	15	RF	08	Y	
02PRC	2	T	3	N	7	N	N	C	20	68	RF	08	Y	60	33	RF	08	Y	
17PRC	1	T	3	Y	0	N	N	C	5	78	RW	08	Y	60	21	RW	08	Y	
17PRC	1	T	3	Y	0	N	N	C	20	84	RW	08	Y	20	7	RW	08	Y	
17PRC	2	T	3	Y	0	N	N	C	20	83	RW	08	Y	60	24	RW	08	Y	
18PRC	1	T	3	Y	7	N	N	C	5	65	RW	08	Y	10	14	RW	08	Y	
18PRC	2	T	3	Y	7	N	N	C	5	44	RF	08	Y	60	60	RW	08	Y	
18PRC	1	T	3	Y	7	N	N	C	20	67	RW	08	Y	60	6	RW	08	Y	
01PRF	1	T	3	N	0	N	N	C	1.3	103	RW	08	Y	10	8	RW	08	Y	
01PRF	2	T	3	N	0	N	N	C	1.3	105	RW	08	Y						
01PRF	3	T	3	N	0	N	N	C	1.3	105	RW	08	Y						
01PRF	1	T	3	N	0	N	N	C	5	106	RW	08	Y	10	11	RW	08	Y	
01PRF	2	T	3	N	0	N	N	C	5	102	RW	08	Y						
01PRF	3	T	3	N	0	N	N	C	5	101	RW	08	Y						
01PRF	1	T	3	N	0	N	N	C	10	107	RW	08	Y						
01PRF	1	T	3	N	0	N	N	C	20	105	RW	08	Y						
01PRF	2	T	3	N	0	N	N	C	20	100	RW	08	Y						
02PRF	1	T	3	N	7	N	N	C	1.3	75	RF	08	Y	10	12	RF	08	Y	
02PRF	2	T	3	N	7	N	N	C	1.3	60	RF	08	Y	60	45	RF	08	Y	
02PRF	1	T	3	N	7	N	N	C	5	72	RF	08	Y	10	5	RF	08	Y	
02PRF	2	T	3	N	7	N	N	C	5	75	RF	08	Y	60	42	RF	08	Y	
02PRF	1	T	3	N	7	N	N	C	10	67	RF	08	Y	10	12	RF	08	Y	
02PRF	2	T	3	N	7	N	N	C	10	66	RF	08	Y	60	27	RF	08	Y	
02PRF	1	T	3	N	7	N	N	C	20	75	RF	08	Y						
02PRF	2	T	3	N	7	N	N	C	20	79	RF	08	Y						
17PRF	1	T	3	Y	0	N	N	C	1.3	91	RF	08	Y	10	8	RF	08	Y	
17PRF	2	T	3	Y	0	N	N	C	1.3	86	RF	08	Y	60	39	RF	08	Y	
17PRF	1	T	3	Y	0	N	N	C	5	92	RF	08	Y	10	6	RF	08	Y	
17PRF	2	T	3	Y	0	N	N	C	5	94	RF	08	Y						
17PRF	1	T	3	Y	0	N	N	C	10	91	RF	08	Y	10	23	RF	08	Y	
17PRF	2	T	3	Y	0	N	N	C	10	87	RF	08	Y	60	43	RF	08	Y	
17PRF	1	T	3	Y	0	N	N	C	20	94	RF	08	Y	10	10	RF	08	Y	
17PRF	2	T	3	Y	0	N	N	C	20	98	RF	08	Y						
18PRF	1	T	3	Y	7	N	N	C	1.3	65	RF	08	Y	10	14	RF	08	Y	
18PRF	2	T	3	Y	7	N	N	C	1.3	66	RF	08	Y	20	21	RF	08	Y	
18PRF	3	T	3	Y	7	N	N	C	1.3	53	RF	08	Y	60	45	RF	08	Y	
18PRF	1	T	3	Y	7	N	N	C	5	56	RF	08	Y	10	14	RF	08	Y	
18PRF	2	T	3	Y	7	N	N	C	5	60	RF	08	Y	20	19	RF	08	Y	
18PRF	3	T	3	Y	7	N	N	C	5	68	RF	08	Y	60	46	RF	08	Y	
18PRF	1	T	3	Y	7	N	N	C	10	54	RF	08	Y	10	8	RF	08	Y	
18PRF	2	T	3	Y	7	N	N	C	10	60	RF	08	Y	20	16	RF	08	Y	
18PRF	3	T	3	Y	7	N	N	C	10	67	RF	08	Y	60	34	RF	08	Y	
18PRF	1	T	3	Y	7	N	N	C	20	58	RF	08	Y	10	3	RF	08	Y	
18PRF	2	T	3	Y	7	N	N	C	20	52	RF	08	Y	20	25	RF	08	Y	



18PRF	3	T	3	Y	7	N	N	C	20	72	RF	BN	Y	60	25	RF	BN	Y
20PRF	1	T	3	Y	7	N	N	U	1.3	48	RF	BF	Y	10	32	RF	BF	Y
20PRF	2	Y	3	Y	7	N	N	U	1.3	58	RF	BF	Y	60	67	RF	BN	Y
20PRF	1	T	3	Y	7	N	N	U	5	69	RF	BF	Y	10	18	RF	BF	Y
20PRF	2	T	3	Y	7	N	N	U	5	67	RF	BF	Y	60	44	RF	BF	Y
20PRF	1	T	3	Y	7	N	N	U	10	70	RF	BF	Y	10	15	RF	BF	Y
20PRF	2	T	3	Y	7	N	N	U	10	71	RF	BF	Y	60	45	RF	BF	Y
20PRF	1	T	3	Y	7	N	N	U	20	68	RF	BF	Y	10	5	RF	BF	Y
20PRF	2	T	3	Y	7	N	N	U	20	75	RF	BF	Y	60	37	RF	BF	Y
01TRF	1	T	3	N	0	N	N	C	1.3	50	RN	BN	Y	10	10	RF	BN	Y
01TRF	2	T	3	N	0	N	N	C	1.3	47	RF	BN	Y	60	109	RF	BN	Y
01TRF	1	T	3	N	0	N	N	C	5	88	RF	BF	Y	10	3	RF	BF	Y
01TRF	2	T	3	N	0	N	N	C	5	106	RF	BF	Y					
01TRF	1	T	3	N	0	N	N	C	10	100	RF	BF	Y	10	5	RF	BF	Y
01TRF	2	T	3	N	0	N	N	C	10	97	RF	BF	Y					
01TRF	1	T	3	N	0	N	N	C	20	102	RF	BF	Y					
01TRF	2	T	3	N	0	N	N	C	20	111	RF	BF	Y	60	18	RF	BF	Y
02TRF	1	T	3	N	7	N	N	C	1.3	43	RF	BF	Y	10	52	RF	BF	Y
02TRF	2	T	3	N	7	N	N	C	1.3	54	RF	BF	Y	20	7	RF	BF	Y
02TRF	3	T	3	N	7	N	N	C	1.3	59	RF	BF	Y	60	40	RF	BF	Y
02TRF	1	T	3	N	7	N	N	C	5	34	RF	BF	Y	10	27	RF	BF	Y
02TRF	2	T	3	N	7	N	N	C	5	45	RF	BF	Y	20	28	RF	BF	Y
02TRF	3	T	3	N	7	N	N	C	5	67	RF	BF	Y	60	57	RF	BF	Y
02TRF	1	T	3	N	7	N	N	C	10	54	RF	BF	Y	10	45	RF	BF	Y
02TRF	2	T	3	N	7	N	N	C	10	47	RF	BF	Y	20	44	RF	BF	Y
02TRF	3	T	3	N	7	N	N	C	10	41	RF	BF	Y	60	83	RF	BF	Y
02TRF	1	T	3	N	7	N	N	C	20	53	RF	BF	Y	10	3	RF	BF	Y
02TRF	2	T	3	N	7	N	N	C	20	82	RF	BF	Y	20	5	RF	BF	Y
02TRF	3	T	3	N	7	N	N	C	20	90	RF	BF	Y	60	23	RF	BF	Y
03TRF	1	T	3	N	0	N	N	U	1.3	93	RW	BW	Y	10	7	RW	BW	Y
03TRF	2	T	3	N	0	N	N	U	1.3	94	RW	BW	Y	60	31	RW	BW	Y
03TRF	1	T	3	N	0	N	N	U	5	95	RW	BW	Y	10	5	RW	BW	Y
03TRF	2	T	3	N	0	N	N	U	5	93	RW	BF	Y					
03TRF	1	T	3	N	0	N	N	U	10	96	RW	BW	Y	10	5	RW	BW	Y
03TRF	2	T	3	N	0	N	N	U	10	98	RW	BF	Y					
03TRF	1	T	3	N	0	N	N	U	20	97	RW	BW	Y	10	7	RW	BW	Y
03TRF	2	T	3	N	0	N	N	U	20	92	RW	BW	Y	60	37	RW	BW	Y
04TRF	1	T	3	N	7	N	N	U	1.3	75	RF	BF	Y	10	18	RF	BF	Y
04TRF	2	T	3	N	7	N	N	U	1.3	84	RF	BF	Y	20	47	RF	BF	Y
04TRF	3	T	3	N	7	N	N	U	1.3	62	RF	BF	Y	60	73	RF	BF	Y
04TRF	1	T	3	N	7	N	N	U	5	64	RF	BF	Y	10	3	RF	BF	Y
04TRF	2	T	3	N	7	N	N	U	5	54	RF	BF	Y	20	6	RF	BF	Y
04TRF	3	T	3	N	7	N	N	U	5	66	RF	BF	Y	60	56	RF	BF	Y
04TRF	1	T	3	N	7	N	N	U	10	78	RF	BF	Y	10	12	RF	BF	Y
04TRF	2	T	3	N	7	N	N	U	10	76	RF	BF	Y	20	35	RF	BF	Y
04TRF	3	T	3	N	7	N	N	U	10	80	RF	BF	Y	60	57	RF	BF	Y
04TRF	1	T	3	N	7	N	N	U	20	73	RF	BF	Y	10	18	RF	BF	Y
04TRF	2	T	3	N	7	N	N	U	20	83	RF	BF	Y	20	12	RF	BF	Y
04TRF	3	T	3	N	7	N	N	U	20	74	RF	BF	Y	60	44	RF	BF	Y
17TRF	1	T	3	Y	0	N	N	C	1.3	89	RW	BF	Y	10	2	RW	BF	Y
17TRF	2	T	3	Y	0	N	N	C	1.3	57	RF	BN	Y	60	77	RF	BN	Y
17TRF	1	T	3	Y	0	N	N	C	5	61	RF	BN	Y	10	2	RF	BN	Y
17TRF	2	T	3	Y	0	N	N	C	5	82	RW	BF	Y	60	13	RW	BF	Y
17TRF	1	T	3	Y	0	N	N	C	10	56	RF	BN	Y	10	1	RF	BN	Y
17TRF	2	T	3	Y	0	N	N	C	10	96	RW	BF	Y					
17TRF	1	T	3	Y	0	N	N	C	20	95	RW	BF	Y	10	2	RW	BF	Y
17TRF	2	T	3	Y	0	N	N	C	20	98	RW	BF	Y					
18TRF	1	T	3	Y	7	N	N	C	1.3	26	RN	BN	Y	10	23	RN	BN	Y

18TRF	2	T	3	Y	7	N	N	C	1.3	48	RF	BN	Y	20	13	RF	BN	Y
18TRF	3	T	3	Y	7	N	N	C	1.3	21	RN	BN	Y	60	57	RF	BF	Y
18TRF	1	T	3	Y	7	N	N	C	5	57	RF	BN	Y	10	12	RF	BN	Y
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19TRF	2	T	3	Y	0	N	N	U	1.3	84	RW	BF	Y	60	46	RW	BN	Y
19TRF	1	T	3	Y	0	N	N	U	5	82	RW	BF	Y	10	9	RW	BN	Y
19TRF	2	T	3	Y	0	N	N	U	5	83	RW	BF	Y	60	40	RW	BN	Y
19TRF	1	T	3	Y	0	N	N	U	10	88	RW	BF	Y	10	7	RW	BN	Y
19TRF	2	T	3	Y	0	N	N	U	10	89	RW	BF	Y	60	42	RW	BN	Y
19TRF	1	T	3	Y	0	N	N	U	20	80	RW	BF	Y	10	3	RW	BN	Y
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01STC	3	S	4	N	0	N	N	C	20	103	RN	BB	Y					

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01THT	1	T	3	N	0	N	N	C	1.3	56	RF	BN	Y	10	7	RW	BN	Y
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01STS	2	T	3	N	0	N	N	C	20	126	RN	BB	Y					
01STS	3	T	3	N	0	N	N	C	20	120	RF	BN	Y	60	95	RW	BN	Y
INISH																		

APPENDIX B  
RAW FIELD DATA

## Column

- 1 Screw diameter in sixteenths of an inch
- 2 Screw type; S=shear, T=tension
- 3-5 Recess type; PH=Phillips, TS=Torq-set, HT=Hi-Torque, H=Internal Hex
- 6-7 Orientation of screw; 1=above head, 2=horizontal, 3=below feet
- 8-11 Mechanics weight
- 12-16 Mechanics experience years
- 17-18 Hours on duty
- 19-20 Bit choice; C=correct, T=wrong type, U=undersize
- 21-22 Bit condition; N=new, W=worn, F=fair
- 23-24 Aircraft type; 1=C-135, 2=F-16, 3=F-15, 4=B-1, 5=F-4, 6=F-5, 7=A-10, 8=F-106, 9=A-7
- 25-26 Recess condition; 1=new, 2=fair, 3=worn
- 27-30 Max removal torque
- 31-34 End load at max torque
- 35-38 Maximum end load
- 39-43 Angle at maximum torque
- 44-48 Maximum angle
- 49-50 1=screw removed, 2=screw not removed
- 51-54 Maximum installation torque
- 55-58 End load at maximum torque
- 59-62 Maximum end load
- 63-67 Angle at maximum torque
- 68-71 Maximum angle
- 72-74 1=no cam-out, 2=cam-out
- 75-76 Environment, C=coast, D=desert, I=inland plain

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21 PH 1 150	2.	4	C	N	5	1	72	33	34	7.	7.	1	51	39	39	1.5	1.5	1	0
21 PH 1 150	2.	4	C	N	5	1	62	53	53	1.5	2.	1	42	51	51	3.	3.	1	0
21 PH 1 150	2.	4	C	N	5	1	66	50	50	2.5	2.5	1	49	56	56	3.5	5.	1	0
21 PH 1 150	2.	4	C	N	5	2	72	70	70	5.5	6.	1	66	64	64	5.5	6.	1	0
21 PH 1 150	2.	4	C	N	5	2	51	64	64	3.	3.	1	72	51	51	3.	5.	1	0
21 PH 1 150	2.	4	C	N	5	3	43	54	54	4.	5.5	1	76	55	56	4.5	4.5	1	0
21 PH 1 150	2.	4	C	N	5	2	70	62	62	2.5	6.	2							0
21 PH 1 150	2.	4	C	N	5	2	62	61	61	6.	6.	2							0
21 PH 1 150	2.	4	C	N	5	3	62	53	56	3.5	6.	2							0
21 TS 1 146	12.	7	C	N	9	1	8	31	32	0.	0.	1	32	16	16	5.5	5.5	1	0
21 TS 3 145	12.	7	C	N	9	1	11	12	12	5.	5.	1	40	28	28	5.5	5.5	1	0
21 TS 3 145	12.	7	C	N	9	2	10	20	21	1.5	1.5	1	40	30	30	3.5	3.5	1	0
21 TS 3 145	12.	7	C	N	9	2	5	17	17	4.5	4.5	1	50	32	32	5.	5.	1	0
21 TS 3 145	12.	7	C	N	9	2	21	31	31	4.5	4.5	1	64	38	38	6.	6.	1	0
21 TS 3 145	12.	7	C	N	9	3	3	37	37	2.5	2.5	1	26	36	36	5.	5.	1	0
21 TS 3 145	12.	7	C	N	9	3	13	37	38	2.5	2.5	1	33	32	32	2.5	2.5	1	0
21 TS 3 145	12.	7	C	N	9	3	12	31	31	4.5	4.5	1	48	36	36	5.5	5.5	1	0
21 HT 2 145	3.	3	C	F	7	1	4	31	31	2.5	1.5	1	20	40	40	0.	0.	1	0
21 HT 2 145	3.	3	C	F	7	1	7	43	41	1.5	1.5	1	21	43	43	0.	0.	1	0
21 HT 2 145	3.	3	C	F	7	1	12	42	42	0.	0.	1	20	40	40	1.5	1.5	1	0
21 HT 2 145	3.	3	C	F	7	2	10	31	38	1.	1.	1	28	49	49	2.	2.	1	0
21 HT 2 145	3.	3	C	F	7	2	5	35	38	1.5	1.5	1	27	47	47	1.	1.	1	0
21 HT 2 145	3.	3	C	F	7	2	5	30	36	2.	2.	1	25	42	42	2.5	2.5	1	0
21 HT 2 145	3.	3	C	F	7	2	5	38	39	1.	1.	1	27	55	55	1.5	1.5	1	0
21 HT 2 145	3.	3	C	F	7	3	9	37	37	2.5	2.5	1	32	63	63	0.	0.	1	0
21 HT 2 145	3.	3	C	F	7	3	5	35	35	1.	1.	1	44	60	60	0.	0.	1	0
21 HT 2 145	3.	3	C	F	7	3	5	43	43	1.	1.	1	27	60	60	0.	0.	1	0
21 HT 1 135	4.	3	C	F	7	1	10	35	35	2.5	2.5	1	23	68	68	3.	3.	1	0
21 HT 1 135	4.	3	C	F	7	1	20	50	50	5.	5.	1	24	63	63	6.	6.	1	0
21 HT 1 135	4.	3	C	F	7	1	18	52	52	2.5	2.5	1	25	70	70	2.5	2.5	1	0
21 HT 2 135	4.	3	C	F	7	1	13	42	42	0.	0.	1	32	68	68	1.	1.	1	0
21 HT 2 135	4.	3	C	F	7	1	7	51	50	4.	4.	1	18	75	75	4.	4.	1	0
21 HT 3 165	4.	7	C	N	7	2	14	7	7	7.	7.	1	30	12	12	1.	1.	1	0
21 HT 3 165	4.	7	C	N	7	3	14	10	10	2.5	2.5	1	43	8	8	5.5	5.5	1	0
21 HT 3 165	4.	7	C	N	7	3	11	12	12	2.5	2.5	1	40	25	25	1.	1.	1	0
21 HT 3 165	4.	7	C	N	7	3	4	9	9	1.	1.	1	38	27	27	1.5	1.5	1	0
21 HT 1 165	4.	7	C	N	7	1	10	10	10	1.5	1.5	1	40	20	20	1.5	1.5	1	0
21 HT 1 165	4.	7	C	N	7	1	13	7	7	4.	4.	1	40	13	13	3.	3.	1	0
21 HT 1 165	4.	7	C	N	7	1	10	31	20	2.5	2.5	1	13	16	16	4.5	4.5	1	0
21 HT 1 165	4.	7	C	N	7	2	10	13	13	1.	1.	1	10	12	12	6.5	6.5	1	0
21 HT 2 165	4.	7	C	N	7	2	12	25	25	6.5	6.5	1	33	25	25	1.	1.	1	0
21 HT 1 165	4.	7	C	N	7	2	10	20	20	7.	7.	1	33	20	20	3.5	3.5	1	0
21 HT 2 165	4.	7	C	N	7	3	3	15	15	1.	1.	1	14	17	17	4.5	4.5	1	0
21 HT 1 165	4.	7	C	N	7	3	41	23	23	2.5	2.5	1	10	15	15	7.5	7.5	1	0
21 HT 1 165	4.	7	C	N	7	3	32	20	20	0.	0.	1	7	26	26	12.	12.	1	0
21 HT 2 165	4.	7	C	N	7	1	10	24	24	2.5	2.5	1	35	10	10	1.5	1.5	1	0
21 HT 2 165	4.	7	C	N	7	1	27	24	24	1.5	1.5	1	42	8	8	2.	2.	1	0
21 HT 2 165	4.	7	C	N	7	1	21	8	8	2.	2.	1	52	6	6	2.	2.	1	0
21 HT 2 165	4.	7	C	N	7	2	17	10	10	2.5	2.5	1	48	8	8	2.5	2.5	1	0
21 HT 2 165	4.	7	C	N	7	2	23	8	8	2.5	2.5	1	49	10	10	1.5	1.5	1	0
21 HT 2 165	4.	7	C	N	7	2	13	7	7	0.	0.	1	60	8	8	4.	4.	1	0
21 HT 2 165	4.	7	C	N	7	3	8	11	11	4.5	4.5	1	35	13	13	1.	1.	1	0
21 HT 2 165	4.	7	C	N	7	3	14	8	8	2.	2.	1	21	28	28	16.5	16.5	1	0
21 HT 2 165	4.	7	C	N	7	3	10	8	8	2.5	2.5	1	42	8	8	6.5	6.5	1	0
21 HT 3 165	4.	7	C	N	7	1	5	12	12	2.5	2.5	1	37	13	13	3.5	3.5	1	0
21 HT 3 165	4.	7	C	N	7	1	7	12	12	1.5	1.5	1	45	12	12	2.	2.	1	0
21 HT 3 165	4.	7	C	N	7	1	17	18	18	5.	5.	1	47	10	10	1.	1.	1	0
21 HT 3 165	4.	7	C	N	7	2	10	11	11	2.	2.	1	54	12	12	5.5	5.5	1	0

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21	HT	3	165	.4	7	C	N	7	2	25	15	15	2.1	2.0	1	43	8	8	.5	.5	1	0
30	HT	2	165	.25	3	C	N	3	1	32	13	13	3.5	5.	1	12	14	14	2.	2.5	1	0
35	HT	2	165	.25	3	C	N	3	1	31	11	11	1.5	3.	1	14	10	10	1.	1.	1	0
35	HT	2	165	.25	3	C	N	3	1	20	14	14	.5	1.	1	30	21	21	1.	1.	1	0
35	HT	2	165	.25	3	C	N	3	2	32	14	13	3.5	3.5	1	25	22	22	3.5	3.5	1	0
35	HT	2	165	.25	3	C	N	3	2	20	23	23	2.	2.	1	22	40	40	2.5	3.	1	0
35	HT	2	165	.25	3	C	N	3	2	33	28	28	3.5	5.	1	16	36	36	3.5	5.	1	0
35	HT	2	165	.25	3	C	N	3	3	31	18	18	2.5	3.	1	17	31	30	1.	1.	1	0
35	HT	2	165	.25	3	C	N	3	3	31	35	35	2.	2.	1	27	48	48	1.5	1.5	1	0
35	HT	2	165	.25	3	C	N	3	1	19	23	24	1.	1.	1	22	19	19	0.	2.5	1	0
35	HT	2	165	.25	3	C	N	3	1	21	14	14	0.	0.	1	11	15	15	3.5	4.	1	0
35	HT	2	165	.25	3	C	N	3	1	25	14	14	.5	.5	1	18	12	12	1.	1.	1	0
35	HT	2	165	.25	3	C	N	3	2	21	18	18	1.	1.5	1	20	17	17	3.5	3.5	1	0
35	HT	2	165	.25	3	C	N	3	2	21	19	19	1.5	1.5	1	22	15	15	3.	0.	1	0
35	HT	2	165	.25	3	C	N	3	2	21	21	21	1.5	1.5	1	24	24	24	.5	.5	1	0
35	HT	2	165	.25	3	C	N	3	3	21	21	21	4.5	4.5	1	18	15	15	1.	4.5	1	0
35	HT	2	165	.25	3	C	N	3	3	16	15	15	1.5	2.5	1	18	8	8	2.	2.	1	0
35	HT	3	165	.25	3	C	N	7	1	21	41	41	5.	6.5	1	18	35	35	6.5	7.	1	0
35	HT	3	165	.25	3	C	N	3	1	31	25	25	5.	5.5	1	20	21	21	5.5	5.5	1	0
35	HT	3	165	.25	3	C	N	3	1	21	31	43	2.5	4.5	1	21	42	42	2.5	3.5	1	0
35	HT	3	165	.25	3	C	N	3	2	20	50	50	4.	4.	1	21	37	37	4.	4.	1	0
35	HT	3	165	.25	3	C	N	3	2	21	31	38	2.5	5.5	1	21	52	52	9.	9.5	1	0
35	HT	3	165	.25	3	C	N	3	2	19	51	51	2.	3.5	1	21	39	39	2.	2.	1	0
35	HT	3	165	.25	3	C	N	3	1	15	30	30	2.5	22.	1	62	8	8	0.	2.	2	0
35	HT	2	165	.5	3	C	N	3	1	22	19	19	1.5	1.5	1	42	19	19	0.	.5	1	0
35	HT	2	165	.5	3	C	N	3	1	24	19	19	1.	1.5	1	24	19	19	0.	0.	1	0
35	HT	2	165	.5	3	C	N	3	2	27	20	10	1.	2.	1	48	12	12	0.	0.	1	0
35	HT	2	165	.5	3	C	N	3	2	24	24	24	0.	1.5	1	36	21	21	1.5	1.5	1	0
35	HT	2	165	.5	3	C	N	3	2	30	22	22	0.	3.	1	50	19	19	0.	0.	1	0
35	HT	2	165	.5	3	C	N	3	3	28	21	21	2.	3.	1	52	18	18	.5	1.	1	0
35	HT	2	165	.5	3	C	N	3	3	18	18	18	0.	1.	1	48	18	18	1.5	1.5	1	0
35	HT	2	165	1.5	4	C	N	3	1	24	35	35	2.5	3.5	1	37	35	35	5.5	7.5	1	0
35	HT	3	190	1.5	4	C	N	3	1	26	32	32	3.5	7.	1	41	40	40	1.5	3.5	1	0
35	HT	3	190	1.5	4	C	N	3	1	42	29	29	1.	4.	1	29	34	34	0.	1.5	1	0
35	HT	3	190	1.5	4	C	N	3	2	25	32	32	4.	7.	1	31	50	50	1.	2.5	1	0
35	HT	3	190	1.5	4	C	N	3	2	14	15	15	2.	2.	1	34	42	42	1.	2.	1	0
35	HT	3	190	1.5	4	C	N	3	2	11	33	33	0.	.5	1	41	49	49	0.	1.	1	0
35	HT	3	190	1.5	4	C	N	3	3	14	34	34	4.	3.5	1	25	49	49	0.	3.5	1	0
35	HT	3	190	1.5	4	C	N	3	3	13	37	37	5.	5.	1	26	40	40	4.	6.5	1	0
35	HT	3	190	1.5	4	C	N	3	3	14	32	32	4.	4.5	1	31	42	42	6.	6.	1	0
35	HT	1	190	1.5	4	C	N	7	1	31	41	41	.5	.5	1	56	38	38	0.	0.	1	0
35	HT	1	190	1.5	4	C	N	3	1	27	45	45	2.5	4.	1	51	41	41	4.	4.	1	0
35	HT	1	190	1.5	4	C	N	3	1	27	46	46	4.	4.5	1	46	43	43	3.5	4.5	1	0
35	HT	1	190	1.5	4	C	N	3	2	33	46	46	1.5	3.5	1	56	46	46	1.5	2.5	1	0
35	HT	1	190	1.5	4	C	N	3	2	30	49	49	0.	2.5	1	41	41	41	0.	2.5	1	0
35	HT	1	190	1.5	4	C	N	3	2	34	47	47	1.5	4.	1	35	47	47	.5	1.5	1	0
35	HT	1	190	1.5	4	C	N	3	3	23	47	47	4.	5.	1	44	46	46	3.5	5.5	1	0
35	HT	1	190	1.5	4	C	N	3	3	17	47	47	2.5	2.5	1	39	46	46	2.5	2.5	1	0
35	HT	1	190	1.5	4	C	N	3	3	19	46	46	2.5	3.	1	41	51	51	3.5	5.	1	0
35	HT	2	195	.2	4	C	N	3	1	23	23	23	7.5	9.	1	51	24	24	2.	2.	1	0
35	HT	2	195	.2	4	C	N	3	1	23	27	27	0.	1.5	1	50	24	24	0.	3.	1	0
35	HT	2	195	.2	4	C	N	3	1	18	18	18	0.	.5	1	61	18	18	0.	2.	1	0
35	HT	2	195	.2	4	C	N	3	1	14	20	20	0.	1.	1	51	18	18	1.5	1.5	1	0
35	HT	2	195	.2	4	C	N	3	1	9	18	19	0.	1.	1	50	25	25	2.5	2.5	1	0
35	HT	3	195	.2	4	C	N	3	1	13	12	12	2.	1.5	1	47	16	16	0.	2.5	1	0
35	HT	3	195	.2	4	C	N	3	1	13	13	13	2.5	4.5	1	45	8	8	6.	6.	1	0
35	HT	3	195	.2	4	C	N	3	1	13	13	13	1.5	2.5	1	41	11	11	2.5	5.	1	0
35	HT	3	195	.2	4	C	N	3	1	14	12	12	2.5	3.	1	30	15	15	7.	7.	1	0

50	HT	3	195	.2	4	C	N	3	1	17	8	8	0.	2.5	1	01	15	15	0.	2.	1	C
51	HT	3	195	.2	4	C	N	3	2	10	10	10	1.5	2.5	1	01	15	15	2.5	4.5	1	C
52	HT	3	195	.2	4	C	N	3	1	12	15	16	2.5	0.	1	50	27	27	3.	5.	1	C
53	HT	3	195	.2	4	C	N	3	1	13	21	21	0.	2.	1	51	24	24	0.5	4.5	1	C
54	HT	3	195	.2	4	C	N	3	1	14	24	24	4.5	0.5	1	54	46	46	1.5	5.	1	C
55	HT	3	195	.2	4	C	N	3	2	2.	16	16	2.5	5.	1	48	21	21	1.5	4.	1	C
56	HT	3	195	.2	4	C	N	3	2	11	25	25	2.	0.	1	01	18	16	2.	2.	1	C
57	HT	1	192	.2	4	C	N	3	1	13	47	47	1.	0.	1	44	38	36	3.	3.	1	C
58	HT	1	192	.2	4	C	N	3	1	24	41	61	0.	2.5	1	57	60	60	4.5	5.5	1	C
59	HT	1	192	.2	4	C	N	3	1	23	51	61	4.5	6.5	2							C
60	HT	1	192	.2	4	C	N	3	1	17	12	92	2.	0.	2							C
61	HT	1	192	1.	4	C	N	3	1	18	54	24	1.5	1.	1	30	39	39	1.5	4.	1	C
62	HT	1	192	14.	4	C	N	3	1	20	46	46	1.	2.5	1	43	42	42	2.	4.	1	C
63	HT	1	192	14.	4	C	N	3	1	20	52	52	1.	2.	1	41	51	51	0.5	2.5	1	C
64	HT	1	192	14.	4	C	N	3	1	17	35	55	1.5	2.	1	30	44	44	0.	1.	1	C
65	HT	1	192	14.	4	C	N	3	1	16	48	48	0.	1.	1	50	43	43	1.	1.5	1	C
66	HT	1	192	14.	4	C	N	3	3	22	63	68	2.	2.5	1	37	56	56	1.	3.	1	C
67	HT	1	192	14.	4	C	N	3	3	22	51	59	1.	3.	1	41	47	47	2.	3.5	1	C
68	HT	1	192	14.	4	C	N	3	3	25	50	50	1.	3.5	1	43	46	46	3.5	3.5	1	C
69	HT	1	192	14.	4	C	N	3	2	19	40	40	1.5	3.	1	36	45	45	3.5	5.5	1	C
70	HT	1	192	14.	4	C	N	3	2	15	30	50	0.5	2.	1	38	45	45	2.5	2.5	1	C
71	HT	1	192	14.	4	C	N	3	2	11	43	43	0.	2.	1	40	39	39	1.	3.	1	C
72	HT	2	195	14.	4	C	N	3	1	20	45	45	1.5	2.5	1	32	30	30	1.5	4.	1	C
73	HT	3	195	14.	4	C	N	3	1	22	51	51	2.5	4.	1	45	39	39	1.5	4.5	1	C
74	HT	3	195	14.	4	C	N	3	1	25	40	40	0.	2.	1	38	31	31	1.	1.5	1	C
75	HT	3	195	14.	4	C	N	3	1	22	49	40	0.	1.5	1	30	42	32	0.	1.	1	C
76	HT	3	195	14.	4	C	N	3	1	23	49	41	0.5	1.	1	44	28	28	0.	1.	1	C
77	HT	2	195	14.	4	C	N	3	1	14	26	26	0.	0.5	1	33	33	33	0.	2.5	1	C
78	HT	2	195	14.	4	C	N	3	1	18	45	45	1.	1.5	1	41	37	32	1.5	2.	1	C
79	HT	2	195	14.	4	C	N	3	1	19	45	45	1.5	1.5	1	55	43	43	0.5	2.	1	C
80	HT	2	195	14.	4	C	N	3	1	21	41	41	3.	3.	1	32	36	36	1.5	2.5	1	C
81	HT	2	195	14.	4	C	N	3	1	17	40	40	2.	2.	1	36	31	33	0.5	1.5	1	C
82	HT	2	195	14.	4	C	N	3	1	19	39	39	1.5	4.	1	37	26	26	0.	1.5	1	C
83	HT	1	195	.2	4	C	N	3	2	15	51	51	1.5	5.5	1	11	46	46	5.	7.	1	C
84	HT	1	195	.2	4	C	N	3	2	9	50	50	4.5	4.5	1	50	47	47	1.5	3.	1	C
85	HT	1	195	.2	4	C	N	3	2	31	31	51	2.	2.5	1	54	45	45	0.	3.5	1	C
86	HT	1	195	.2	4	C	N	3	3	27	36	66	3.5	6.	1	41	56	56	2.5	3.	1	C
87	HT	1	195	.2	4	C	N	3	3	18	57	57	4.5	5.5	1	36	48	48	3.5	0.	1	C
88	HT	1	195	.2	4	C	N	3	3	17	63	65	4.	5.5	1	40	63	63	4.	4.5	1	C
89	HT	3	180	7.	1	C	N	3	1	37	53	59	0.	0.	1	24	36	36	0.	4	1	C
90	HT	3	180	7.	1	C	N	3	1	32	73	73	1.	1.	1	30	35	35	0.	0.	1	C
91	HT	3	180	7.	1	C	N	3	1	43	63	63	1.5	1.5	1	28	32	32	0.5	0.5	1	C
92	HT	3	180	7.	1	C	N	3	2	17	77	77	1.	1.	1	37	30	30	0.	0.	1	C
93	HT	3	180	7.	1	C	N	3	2	24	74	74	0.	4.	1	27	28	28	0.	0.	1	C
94	HT	3	180	7.	1	C	N	3	2	37	73	73	3.5	3.5	1	29	27	27	0.5	0.5	1	C
95	HT	3	180	7.	1	C	N	3	3	16	60	60	0.	0.	1	31	40	40	0.	0.	1	C
96	HT	3	180	7.	1	C	N	3	3	20	60	60	1.	1.	1	28	43	43	1.	1.	1	C
97	HT	3	180	7.	1	C	N	3	3	37	70	76	0.	0.	1	45	37	37	0.	0.	1	C
98	HT	3	180	0.5	3	C	N	3	1	20	4	4	4.	4.	1	31	10	10	2.	4.	1	C
99	HT	3	180	0.5	3	C	N	3	1	17	10	10	0.	1.	1	28	9	9	1.5	1.5	1	C
100	HT	3	180	0.5	3	C	N	3	1	14	14	14	1.5	2.5	1	27	19	19	3.	3.5	1	C
101	HT	3	180	0.5	3	C	N	3	1	11	11	11	3.	3.	1	24	16	16	2.5	3.5	1	C
102	HT	3	180	0.5	3	C	N	3	1	16	25	25	2.5	2.5	1	24	21	21	3.5	3.5	1	C
103	HT	3	180	0.5	3	C	N	3	1	21	30	30	1.	4.	1	13	14	14	2.	3.5	1	C
104	HT	3	180	0.5	3	C	N	3	1	27	32	32	0.5	1.5	1	14	19	19	3.	4.	1	C
105	HT	3	180	0.5	3	C	N	3	1	20	20	20	1.	1.	1	14	19	19	1.5	1.5	1	C
106	HT	3	180	0.5	3	C	N	3	1	29	21	21	0.	0.	1	29	16	16	3.	3.	1	C
107	HT	3	180	0.5	3	C	N	3	2	33	17	17	1.	2.	1	20	13	13	3.	3.5	1	C

30	HT	2	140	6.5	3	C	N	3	1	11	9	9	1	46	17	17				1	C		
30	HT	2	140	6.5	3	C	N	3	1	16	22	22	1	41	23	23					1	C	
30	HT	2	140	6.5	3	C	N	3	1	25	16	16	1	37	22	22					1	C	
30	HT	2	140	6.5	3	C	N	3	2	24	31	33	1	45	31	31					1	C	
30	HT	2	140	6.5	3	C	N	3	2	11	22	22	1	27	23	23					1	C	
30	HT	2	140	6.5	3	C	N	3	2	24	24	24	1	34	25	25					1	C	
30	HT	2	140	6.5	3	C	N	3	3	31	31	31	1	37	34	34					1	C	
30	HT	2	140	6.5	3	C	N	3	1	27	15	19	2	3	1	47	19	16	1	4		1	C
30	HT	1	140	6.5	3	C	N	3	1	32	17	17	2	3.5	1	51	26	26	3.5	3.5		1	C
30	HT	1	140	6.5	3	C	N	3	1	24	23	20	2	2	1	29	30	30	2	1.5		1	C
30	HT	1	140	6.5	3	C	N	3	2	16	23	23	3	1	1	48	29	29	5	5		1	C
30	HT	1	140	6.5	3	C	N	3	2	23	17	17	1	5	1	46	25	27	3	3		1	C
30	HT	1	140	6.5	3	C	N	3	2	21	72	72	4	6.5	1	42	58	58	2.5	4		1	C
30	HT	1	140	6.5	3	C	N	3	3	27	47	47	2	2	1	41	45	42	3	2.5		1	C
30	HT	1	140	6.5	3	C	N	3	3	34	73	73	2	2.5	1	32	43	43	1.5	3.5		2	C
30	HT	1	140	6.5	3	C	N	3	3	31	31	31	2.5	3	1	50	33	33	1.5	2.5		1	C
30	HT	1	123	3	7	C	N	3	1	24	10	10	4	4	1	44	15	15	2	2		1	C
30	HT	1	123	3	7	C	N	3	1	23	9	8	2	2	1	38	12	12	2	2		1	C
30	HT	2	123	3	7	C	N	3	2	18	4	4	2	2	1	58	16	16	3	3		1	C
30	HT	2	123	3	7	C	N	3	2	15	10	10	2.5	2.5	1	27	19	16	1.5	1.5		1	C
30	HT	2	123	3	7	C	N	3	2	30	4	4	3	3	1	46	5	5	3	3		1	C
30	HT	2	123	3	7	C	N	3	3	1	4	4	2.5	2.5	1	25	2	4	2.5	2.5		1	C
30	HT	2	123	3	7	C	N	3	3	24	3	3	4.5	4.5	1	37	4	4	4.5	4.5		1	C
30	HT	1	123	3	7	C	N	3	1	31	20	31	1.5	1.5	1	32	27	32	1.5	1.5		1	C
30	HT	1	123	3	7	C	N	3	1	23	23	23	2	2	1	42	34	34	2.5	2.5		1	C
30	HT	1	123	3	7	C	N	3	1	21	21	21	2	2	1	54	28	23	1.5	1.5		1	C
30	HT	3	123	3	7	C	N	3	2	8	12	12	1.5	1.5	1	22	10	10	1	1		1	C
30	HT	3	123	3	7	C	N	3	2	39	28	29	1.5	1.5	1	31	29	29	5	5		1	C
30	HT	3	123	3	7	C	N	3	2	22	21	21	2.5	2.5	1	60	22	22	0	6		1	C
30	HT	3	123	3	7	C	N	3	3	13	21	21	1	1	1	11	19	19	2	2		2	C
30	HT	3	123	3	7	C	N	3	3	5	30	30	1	1	1	31	18	18	0	5		1	C
30	HT	3	123	3	7	C	N	3	3	21	16	16	0	0	1	31	24	24	0	0		1	C
30	HT	1	123	3	7	C	N	3	1	41	45	48	2	3	1	36	52	52	2	2		1	C
30	HT	1	123	3	7	C	N	3	1	33	43	43	1	1	1	36	50	50	1	1		1	C
30	HT	1	123	3	7	C	N	3	1	35	43	43	4.5	4.5	1	48	40	40	3	3		1	C
30	HT	1	123	3	7	C	N	3	2	25	55	65	0.5	0.5	1	36	46	46	3.5	3.5		1	C
30	HT	1	123	3	7	C	N	3	2	20	53	53	7	7	1	32	59	59	7	7		1	C
30	HT	1	123	3	7	C	N	3	2	21	48	42	0	0	1	42	48	48	6	6		1	C
30	HT	2	123	3	7	C	N	3	1	28	17	13	4	4	1	44	15	15	2	2		1	C
30	HT	1	123	3	7	C	N	3	3	32	40	45	1.5	2.5	1	32	48	48	3	5		1	C
30	HT	1	123	3	7	C	N	3	3	35	48	48	0	0	1	58	51	51	2.5	3.5		1	C
30	HT	1	123	3	7	C	N	3	3	24	37	37	3.5	3.5	1	58	44	44	1.5	2		1	C
30	HT	1	123	3	7	C	N	3	1	27	28	28	5	5	1	50	34	34	2.5	2.5		1	C
30	HT	1	123	3	7	C	N	3	2	14	35	32	2.5	2.5	1	42	38	38	2	2		1	C
30	HT	1	123	3	7	C	N	3	2	21	35	35	3.5	3.5	1	41	45	45	2.5	2.5		1	C
30	HT	1	123	3	7	C	N	3	2	38	28	29	1	1	1	60	35	35	2.5	2.5		1	C
30	HT	2	123	3	7	C	N	3	3	26	50	50	1	2.5	1	28	44	44	5	2.5		2	C
30	HT	1	123	3	7	C	N	3	3	16	46	46	1	3	1	31	64	64	5	3		1	C
30	HT	1	123	3	7	C	N	3	3	23	43	40	3.5	3.5	1	43	56	56	0	3		1	C
30	HT	3	123	3	7	C	N	3	1	24	25	25	3	3	1	33	33	33	3	3		1	C
30	TS	3	170	6.5	2	C	N	2	1	24	38	38	0.5	3.5	1	32	43	43	2.5	3.5		2	C
30	TS	3	170	6.5	2	C	N	2	1	23	39	32	0.5	7.5	1	30	46	46	0.5	1.5		1	C
30	TS	3	170	6.5	2	C	N	2	1	17	45	45	0.5	2.0	1	31	40	40	5.5	5.5		2	C
30	TS	3	170	6.5	2	C	N	2	1	7	29	20	0.5	2.0	1	29	35	35	7.5	7.5		1	C
30	TS	3	171	6.5	2	C	N	2	2	17	29	28	0.1	2.1	1	27	38	38	1.5	1.5		1	C
30	TS	3	171	6.5	2	C	N	2	2	25	35	32	6.5	6.5	1	39	39	39	7.0	9.0		1	C
30	TS	3	171	6.5	2	C	N	2	3	5	11	11	4.5	4.5	1	21	61	61	1.5	3.5		1	C
30	TS	3	171	6.5	2	C	N	2	1	39	75	75	1	1	1	77	77	77				1	C



35 TS 1 170	5.5	1	C	N	2	1	13	52	82			1	52	90	30			2	0		
35 TS 1 170	5.5	1	C	N	2	2	18	45	95			1	34	65	85			1	0		
35 TS 1 170	5.5	1	C	N	2	2	14	72	72			1	47	74	74			1	0		
35 TS 1 170	5.5	1	C	N	2	3	15	71	71			1	46	70	70			1	0		
35 TS 1 170	5.5	1	C	N	2	3	16	73	73			1	50	79	79			1	0		
35 TS 1 170	5.5	1	C	N	2	3	16	75	75			1	43	70	70			1	0		
35 TS 1 170	2.5	6	C	G	2	1	23	23	23	2.5	3.0	1	26	24	24	.5		2.5	1	0	
35 TS 1 170	2.5	6	C	G	2	1	28	23	23	0.	2.	1	33	27	27	1.		1.	1	0	
35 TS 1 170	2.5	6	C	G	2	1	24	36	36	.5	.5	1	19	26	26	.5		1.	1	0	
35 TS 1 170	2.5	6	C	G	2	1	23	24	24	2.5	3.	1	22	21	21	1.		2.5	1	0	
35 TS 1 170	2.5	6	C	G	2	2	24	32	32	0.	0.	1	22	35	35	.5		1.5	1	0	
35 TS 1 170	2.5	6	C	G	2	2	13	31	31	1.	2.	1	23	32	32	1.5		2.1	1	0	
35 TS 3 170	3.	2	C	G	2	1	21	33	33	3.5	5.	1	22	32	32	3.		4.5	1	0	
35 TS 3 170	3.	2	C	G	2	2	21	24	24	1.	2.	1	14	22	22	3.5		4.5	1	0	
35 TS 3 171	3.	2	C	G	2	2	24	31	31	1.	3.5	1	18	49	49	3.		3.5	1	0	
35 TS 1 170	3.	2	C	G	2	1	34	23	23	.5	3.	1	41	27	27	1.		1.5	1	0	
35 TS 1 170	3.	2	C	G	2	1	12	29	29	0.	1.	1	25	24	24	0.		1.	2	0	
35 TS 1 170	3.	2	C	G	2	1	16	28	28	1.	1.	1	13	32	32	2.5		5.	1	0	
35 TS 1 170	3.	2	C	G	2	2	21			2.5	4.	1	17			4.		5.	1	0	
35 TS 1 170	3.	2	C	G	2	2	13			3.5	5.	1	16			3.5		5.	1	0	
35 TS 1 170	3.	2	C	G	2	3	16			5.	1.	2	15			2.5		3.5	1	0	
35 TS 1 170	3.	2	C	G	2	3	14			3.	5.	1	5			3.5		5.	1	0	
35 TS 3 185 13.	13.	1	C	N	2	1	28	23	23	.5	4.	1	33	50	50	.5		3.	1	0	
35 TS 3 185 13.	13.	1	C	N	2	1	33	33	33	1.5	3.	1	26	53	53	1.		1.	1	0	
35 TS 3 185 13.	13.	1	C	N	2	1	9	47	47	2.	3.	1	29	50	50	.5		3.5	1	0	
35 TS 3 185 13.	13.	1	C	N	2	2	12	26	26	2.5	2.5	1	26	48	48	0.		1.5	1	0	
35 TS 3 185 13.	13.	1	C	N	2	2	32	27	27	.5	1.	1	35	38	38	2.		2.	1	0	
35 TS 3 185 13.	13.	1	C	N	2	2		31	31	2.	3.	1	25	63	63	3.		3.	1	0	
35 TS 3 185 13.	13.	1	C	N	2	3	15	45	46	.5	1.	1	7	65	65	3.		1.	1	0	
35 TS 3 185 13.	13.	1	C	N	2	3	12	34	34	4.	4.	1	31	76	76	3.		4.	1	0	
35 TS 3 185 13.	13.	1	C	N	2	3	13	44	44	2.5	3.5	1	5	68	68	3.5		3.5	1	0	
35 TS 1 185 13.	13.	1	C	N	2	1	24	33	33	1.5	3.0	1	14	38	38	1.5		2.0	1	0	
35 TS 1 185 13.	13.	1	C	N	2	1	44	44	44	2.5	3.5	1	32	63	63	2.5		4.5	1	0	
35 TS 1 185 13.	13.	1	C	N	2	1	14	42	42	2.5	5.0	1	51	60	60	2.		4.5	1	0	
35 TS 1 185 13.	13.	1	C	N	2	2	33	43	43	1.	4.	1	40	48	48	2.5		4.5	1	0	
35 TS 1 185 13.	13.	1	C	N	2	2	10	43	48	5.	5.	1	27	57	57	1.		5.	1	0	
35 TS 1 185 13.	13.	1	C	N	2	2	17	32	32	3.5	5.5	1	21	48	48	0.		3.5	1	0	
35 TS 1 185 13.	13.	1	C	N	2	3	13	41	41	4.	5.	1	17	59	59	1.5		1.5	1	0	
35 TS 1 185 13.	13.	1	C	N	2	3	16	32	32	1.5	1.5	1	21	51	51	2.5		3.	1	0	
35 TS 1 190	2.5	6	C	G	2	1	13	15	15	2.5	5.	1	21	16	16	2.5		2.5	2	0	
35 TS 1 190	2.5	6	C	G	2	1	17	13	18	3.	6.5	1	13	30	30	6.		6.5	1	0	
35 TS 1 190	2.5	6	C	G	2	1	17	17	17	1.5	3.	1	21	18	18	2.0		2.5	1	0	
35 TS 1 190	2.5	6	C	G	2	1	21	9	9	1.	2.5	1	14	15	15	1.5		2.5	1	0	
35 TS 1 190	2.5	6	C	G	2	1	14	17	17	3.5	6.0	1	18	12	12	1.5		4.	1	0	
35 TS 1 190	2.5	6	C	G	2	2	13	11	11	.5	1.	1	24	11	11	1.		1.	1	0	
35 TS 3 171	3.	2	C	G	2	1	14	31	31	3.	3.	1	31	31	31	2.5		2.5	1	0	
35 TS 3 170	3.	2	C	G	2	2	8	26	26	1.	2.	1	15	27	27	.5		1.5	1	0	
35 TS 3 170	3.	2	C	G	2	1	34	36	36	2.	2.5	1	26	32	32	1.		1.5	1	0	
35 TS 3 170	3.	2	C	G	2	1	18	29	29	3.	4.	1	13	27	27	2.5		2.5	1	0	
31 PH 3 190	7.	2	C	N	1	1	32	32	0.	1.	2.	2								1	0
31 PH 1 190	7.	2	C	N	9	2	21	23	23	2.5	2.5	1	55	35	35	3.5		3.5	1	0	
31 HT 3 190	7.	1	C	N	3	3	27	70	70	0.	0.	1	62	56	56	2.		2.	1	0	
31 HT 3 190	7.	1	C	N	3	3	7	64	68	2.	2.	1	28	30	30	1.5		1.5	1	0	
31 HT 3 190	7.	1	C	N	3	3	64	77	77	1.5	1.5	1	34	37	37	0.		0.	1	0	
31 PH 3 200	6.	1	C	F	9	3	13	34	34	2.5	2.5	1	34	46	46	7.		7.	1	0	
31 PH 1 200	6.	1	C	F	9	3	29	33	33	0.	0.	1	42	34	34	2.5		2.5	1	0	
31 PH 1 200	6.	1	C	F	9	3	13	35	35	0.	0.	1	27	34	34	5.		5.	1	0	
31 PH 1 200	6.	1	C	F	9	3	28	40	40	3.	3.	1	30	42	42	2.		2.	1	0	

31 HT	1	180	7.	1	C	N	3	3	15	39	38	0.	0.	1	27	18	18	0.	0.	1	C
31 HT	1	180	7.	1	C	N	3	3	6	31	30	0.	0.	1	20	18	18	1.	1.	1	C
31 HT	1	180	7.	1	C	N	3	3	5	53	53	1.	1.	1	18	17	17	0.	0.	1	C
31 HT	2	150	7.	1	C	N	3	3	29	30	60	0.	0.	1	31	33	33	0.	0.	1	C
31 HT	2	180	7.	1	C	N	3	3	26	36	56	0.	2.5	1	36	36	36	1.5	1.5	1	C
31 HT	2	180	7.	1	C	N	3	3	17	07	77	0.	3.5	1	36	23	23	0.	0.	1	C
31 HT	2	180	7.	1	C	N	3	3	27	30	30	0.	0.	1	22	10	10	0.	0.	1	C
31 HT	2	180	7.	1	C	N	3	3	52	35	35	1.	1.	1	22	16	16	0.5	0.5	1	C
31 HT	2	180	7.	1	C	N	3	3	13	00	00	0.	0.	1	23	17	17	1.	1.	1	C
31 TS	2	200	6.	0	C	F	9	3	20	23	23	0.	0.	1	40	25	25	2.	2.	1	D
31 TS	2	200	6.	0	C	F	9	3	27	63	63	1.5	1.5	1	30	60	60	10.	10.	1	D
31 TS	2	200	6.	0	C	F	9	3	12	05	05	0.	0.	1	41	00	00	5.	5.	1	D
31 PH	3	150	0.	2	C	N	1	3	41	27	27	2.	2.	1	22	22	22	3.	3.	1	I
31 PH	3	150	0.	2	C	N	1	3	43	25	25	3.5	3.5	1	25	25	25	4.	4.	1	I
31 PH	3	150	0.	2	C	N	1	3	22	40	46	2.	2.	1	37	40	40	0.	0.	1	I
31 PH	3	145	0.	2	C	N	1	3	11	20	20	0.	0.	1	8	12	12	11.	11.5	1	I
31 PH	3	145	0.	2	C	N	1	3	29	40	40	1.5	1.5	1	30	30	30	0.	0.	1	I
31 PH	3	145	0.	2	C	N	1	3	31	33	33	1.5	1.5	1	30	20	20	0.	0.	1	I
31 PH	3	145	0.	2	C	N	1	3	4	9	9	10.	10.	1	10	15	15	7.5	7.5	1	I
31 PH	3	140	0.	2	C	N	1	3	27	33	33	2.5	2.5	1	22	33	33	7.5	7.5	1	D
31 PH	3	140	0.	2	C	N	1	3	23	31	30	0.	0.	1	20	32	32	7.5	7.5	1	D
31 PH	3	140	0.	2	C	N	1	3	27	23	25	4.5	4.5	1	10	37	37	7.5	7.5	1	D
31 TS	3	140	0.	2	C	N	9	3	14	33	33	3.5	3.5	1	30	42	42	0.	0.	1	D
31 TS	3	140	0.	2	C	N	9	3	15	33	33	0.	0.	1	40	20	20	1.	1.	1	D
31 TS	3	140	0.	2	C	N	9	3	23	25	25	10.	10.	1	05	40	40	8.	8.	1	D
31 PH	1	140	0.	2	C	N	9	3	20	51	50	7.5	7.5	1	03	06	06	2.	2.	1	D
31 PH	1	140	0.	2	C	N	9	3	10	45	45	0.	0.	1	70	50	50	0.	0.	1	D
31 PH	1	140	0.	2	C	N	9	3	12	45	45	3.	3.	1	72	52	52	2.5	2.5	1	D
31 TS	1	140	0.	2	C	N	9	3	33	33	33	0.	0.	1	40	35	35	0.	0.	1	D
31 TS	1	140	0.	2	C	N	9	3	52	32	32	2.5	2.5	1	50	33	33	4.5	4.5	1	D
31 TS	2	140	0.	2	C	N	9	3	20	30	30	5.	5.	1	50	40	40	5.	5.	1	D
31 TS	2	140	0.	2	C	N	9	3	22	35	35	3.	3.	1	45	40	40	2.	2.	1	D
31 TS	2	140	0.	2	C	N	9	3	12	31	31	0.	0.	1	55	36	36	0.	0.	1	D
31 PH	3	170	11.	2	C	N	1	3	51	51	50	1.5	1.5	1	35	28	28	0.5	0.5	1	I
31 PH	3	170	11.	2	C	N	1	3	24	52	52	2.5	2.5	1	32	29	29	1.	1.5	1	I
31 PH	3	170	11.	2	C	N	1	3	31	35	35	3.5	3.5	1	22	30	30	3.	3.	1	I
31 PH	3	170	11.	2	C	N	1	3	22	23	23	4.	4.	1	23	20	20	6.	6.5	1	I
31 PH	3	170	11.	2	C	N	1	3	12	00	00	4.5	4.5	1	22	30	30	0.	0.5	1	I
31 PH	3	170	11.	2	C	N	1	3	20	110	100	2.	2.	1	5	35	60	0.5	2.	1	I
31 PH	3	170	11.	2	C	N	1	3	51	95	100	1.	1.	1	18	00	00	0.	0.	1	I
31 PH	3	170	11.	2	C	N	1	3	40	110	110	0.5	0.5	1	0	0	0	0.	0.	1	I
31 HT	3	180	7.	1	C	N	3	2	39	57	57	0.	0.	1	43	33	33	0.	0.	1	C
31 HT	3	180	7.	1	C	N	3	2	30	70	70	1.	1.	1	46	36	36	0.	0.	1	C
31 HT	3	180	7.	1	C	N	3	2	33	60	60	4.5	4.5	1	47	50	50	0.5	0.5	1	C
31 TS	3	200	6.	0	C	F	9	2	15	28	28	2.	2.	1	25	40	40	2.	2.	1	D
31 TS	3	200	6.	0	C	F	9	2	21	30	30	1.	1.	1	18	20	20	6.	6.	1	D
31 TS	3	200	6.	0	C	F	9	2	12	25	25	3.	3.	1	30	47	47	8.5	8.5	1	D
31 PH	3	200	6.	0	C	F	9	2	11	40	40	4.	4.	1	35	50	50	5.5	5.5	1	D
31 PH	3	200	6.	0	C	F	9	2	12	31	31	1.	1.	1	30	55	55	4.5	4.5	1	D
31 PH	3	200	6.	0	C	F	9	2	22	62	62	4.5	4.5	1	30	50	50	2.5	2.5	1	D
31 PH	1	200	6.	0	C	F	9	2	30	30	38	7.5	7.5	1	22	55	55	2.5	2.5	1	D
31 PH	1	200	6.	0	C	F	9	2	15	40	40	2.5	2.5	1	30	40	40	0.	0.	1	D
31 PH	1	200	6.	0	C	F	9	2	15	35	35	2.5	2.5	1	30	50	50	2.5	2.5	1	D
31 TS	2	200	6.	0	C	F	9	2	43	105	105	0.	0.	1	0	0	0	0.	0.	1	D
31 TS	1	200	6.	0	C	F	9	2	40	30	40	2.5	2.5	1	0	0	0	0.	0.	1	D
31 TS	1	200	6.	0	C	F	9	2	47	73	73	5.	5.	1	30	0	0	7.5	7.5	1	D
31 HT	2	180	7.	1	C	N	3	2	10	23	23	0.	0.	1	30	20	20	0.	0.	1	C
31 HT	2	180	7.	1	C	N	3	2	3	51	53	0.	0.	1	30	23	23	0.	0.	1	C

3T HT	1	181	7.	1	C	N	3	2	13	33	43	0.	1.5	1	34	18	18	0.	0.	1	C
3T HT	2	180	7.	1	C	N	3	2	27	70	73	0.	0.5	1	25	30	30	0.	0.	1	C
3T HT	2	183	7.	1	C	N	3	2	25	60	61	0.	0.	1	22	43	43	0.	0.	1	C
3T HT	2	185	7.	1	C	N	3	2	33	53	54	0.	1.5	1	26	30	30	0.	0.	1	C
3T HT	2	183	7.	1	C	N	3	2	54	30	33	0.	0.	1	24	13	13	0.	0.	1	C
3T HT	2	180	7.	1	C	N	3	2	52	33	30	2.	2.	1	24	13	13	0.	0.	1	C
3T HT	2	181	7.	1	C	N	3	2	57	48	48	0.	0.	1	20	17	17	0.	0.	1	C
3T TS	2	200	6.	0	C	F	9	2	31	20	20	0.	0.	1	33	25	25	5.	5.	1	D
3T TS	2	200	6.	0	C	F	9	2	22	25	25	3.	3.	1	31	25	25	2.5	2.5	1	D
3T TS	2	200	6.	0	C	F	9	2	15	22	22	2.	2.	1	40	20	20	0.	0.	1	D
3T PH	3	150	0.	2	C	N	1	2	11	48	48	3.5	3.5	1	32	43	43	1.	1.5	1	I
3T PH	3	150	0.	2	C	N	1	2	22	45	45	5.	5.	1	33	41	41	1.	2.	1	I
3T PH	3	150	0.	2	C	N	1	2	20	53	53	2.	2.	1	40	42	42	0.5	0.5	1	I
3T PH	3	145	0.	2	C	N	1	2	11	22	22	5.	5.	1	14	34	34	2.5	2.5	1	I
3T PH	3	147	0.	2	C	N	1	2	21	23	22	8.	8.	1	32	25	25	2.5	3.	1	I
3T PH	3	147	0.	2	C	N	1	2	23	29	28	4.5	4.5	1	22	30	30	3.	3.	1	I
3T PH	3	145	0.	2	C	N	1	2	8	5	8	5.	5.	1	15	15	20	7.5	7.5	1	I
3T PH	3	145	0.	2	C	N	1	2	5	11	19	6.	6.	1	15	10	10	7.	7.	1	I
3T TS	3	140	0.	2	C	N	9	2	12	38	39	11.	11.	1	32	30	30	8.	8.	1	D
3T TS	3	140	0.	2	C	N	9	2	20	35	35	2.	2.	1	36	40	40	7.	7.	1	D
3T TS	3	140	0.	2	C	N	9	2	25	30	30	5.	5.	1	32	42	42	3.	3.	1	D
3T PH	3	140	0.	2	C	N	9	2	25	23	20	5.	5.	1	26	32	32	2.	2.	1	D
3T PH	3	140	0.	2	C	N	9	2	32	35	35	5.	5.	1	26	29	29	2.5	2.5	1	D
3T PH	3	140	0.	2	C	N	9	2	41	34	34	7.	7.	1	41	40	40	4.	4.	1	D
3T PH	3	140	0.	2	C	N	9	2	24	33	33	8.	8.	1	47	32	32	4.	4.	1	D
3T PH	3	140	0.	2	C	N	3	2	13	35	35	6.5	6.5	1	6.	50	50	1.	1.	1	D
3T TS	3	140	0.	2	C	N	9	2	25	20	25	0.	0.	1	60	35	35	0.	0.	1	D
3T TS	3	140	0.	2	C	N	9	2	20	30	33	3.	3.	1	60	35	35	2.5	2.5	1	D
3T TS	3	140	0.	2	C	N	9	2	17	32	32	2.	2.	1	60	35	35	2.5	2.5	1	D
3T TS	3	140	0.	2	C	N	9	2	22	21	25	9.	9.	1	45	30	30	0.	0.	1	D
3T TS	3	140	0.	2	C	N	9	2	2	33	33	5.	5.	1	30	30	30	4.	4.	1	D
3T TS	3	140	0.	2	C	N	9	2	43	29	25	1.	1.	1	40	25	25	7.5	7.5	1	D
3T PH	3	171	11.	2	C	N	1	2						1	25	40	40	1.	1.5	1	I
3T PH	3	170	11.	2	C	N	1	2	08	44	48	0.	0.	1	22	30	30	0.	1.	1	I
3T PH	3	170	11.	2	C	N	1	2	40	95	101	2.	2.	1	20	64	64	1.	1.	1	I
3T PH	3	170	11.	2	C	N	1	2	40	95	105	2.	2.	1	21	54	54	2.	2.	1	I
3T PH	3	170	11.	2	C	N	1	2	30	95	95	1.5	1.5	1	18	42	42	0.5	0.5	1	I
3T PH	3	170	11.	2	C	N	1	2	33	115	115	1.5	1.5	1	31	55	55	2.	2.	1	I
3T PH	3	151	11.2	2	C	N	1	2	55	120	120	4.5	4.5	1	40	70	70	3.5	4.	1	I
3T PH	3	200	6.	0	C	F	9	1	10	35	55	4.	4.	1	37	60	60	6.	6.	1	D
3T PH	3	200	6.	0	C	F	9	1	8	45	45	2.	2.	1	34	55	55	0.	0.	1	D
3T PH	3	200	6.	0	C	F	9	1	31	77	75	5.	5.	1	32	50	50	4.	4.	1	D
3T HT	3	180	7.	1	C	N	3	1	24	72	72	0.5	0.5	1	3.	30	30	3.	3.	1	C
3T HT	3	180	7.	1	C	N	3	1	19	67	67	3.	3.	1	43	28	28	0.	0.	1	C
3T HT	3	180	7.	1	C	N	3	1	23	50	66	1.5	1.5	1	45	37	37	0.	0.	1	C
3T TS	3	200	6.	0	C	F	9	1	15	22	22	2.	2.	1	23	40	40	2.5	2.5	1	D
3T TS	3	200	6.	0	C	F	9	1	13	42	42	0.	0.	1	20	50	50	2.5	2.5	1	D
3T TS	3	200	6.	0	C	F	9	1	10	30	30	2.	2.	1	20	45	45	2.5	2.5	1	D
3T PH	3	200	6.	0	C	F	9	1	10	43	43	2.5	2.5	1	37	37	37	5.	5.	1	D
3T PH	3	200	6.	0	C	F	9	1	10	35	35	4.	4.	1	30	30	30	5.	5.	1	D
3T PH	3	200	6.	0	C	F	9	1	5	32	32	5.	5.	1	38	38	38	2.5	2.5	1	D
3T HT	3	180	7.	1	C	N	3	1	14	51	50	3.	3.	1	20	17	17	0.	0.	1	C
3T HT	3	180	7.	1	C	N	3	1	10	43	43	3.	3.	1	25	13	13	0.	0.	1	C
3T HT	3	180	7.	1	C	N	3	1	8	43	43	2.	2.	1	23	17	17	0.	0.	1	C
3T TS	3	200	6.	0	C	F	9	1	18	35	35	5.	5.	1	25	35	35	7.5	7.5	1	D
3T TS	3	200	6.	0	C	F	9	1	15	30	30	7.	7.	1	35	35	35	7.	7.	1	D
3T TS	3	200	6.	0	C	F	9	1	11	32	32	7.	7.	1	34	32	32	5.	5.	1	D
3T HT	3	180	7.	1	C	N	3	1	30	22	22	1.	1.	1	20	15	15	0.5	0.5	1	C

31	HT	2	183	7.	1	C	N	3	1	40	44	44	0.	1.	1	30	20	20	0.	0.	1	C	
31	HT	2	189	7.	1	C	N	3	1	51	33	33	0.	1.	1	23	18	18	0.	0.	1	C	
31	TS	2	200	6.	1	C	F	9	1	25	25	25	2.	2.	1	40	30	30	2.5	2.5	1	O	
31	TS	2	201	6.	1	C	F	9	1	11	17	17	2.5	2.5	1	22	30	30	3.	3.	1	O	
31	TS	2	209	6.	0	C	F	9	1	15	18	18	3.	3.	1	32	23	23	3.	3.	1	O	
31	HT	2	190	7.	1	C	N	3	1	37	34	34	0.	1.	1	33	26	26	1.	1.	1	C	
31	HT	2	199	7.	1	C	N	3	1	40	43	43	1.	1.	1	31	27	27	1.	1.	1	C	
31	PH	3	145	0.	2	C	N	1	1	15	15	15	1.	1.	1	22	19	20	7.	7.	1	I	
31	PH	3	150	0.	2	C	N	1	1	40	41	41	7.	7.	2							I	
31	PH	3	120	0.	2	C	N	1	1	41	41	41	3.	3.	2							I	
31	PH	3	150	0.	2	C	N	1	1	28	35	35	1.	1.	1	35	50	50	1.	1.5	1	I	
31	PH	3	152	0.	2	C	N	1	1	41	51	51	3.5	3.5	1	25	40	40	4.	4.	1	I	
31	PH	3	159	0.	2	C	N	1	1	10	14	14	2.5	3.	1	28	40	40	3.	3.5	1	I	
31	PH	3	155	0.	2	C	N	1	1	15	21	20	2.	3.	1	18	25	25	8.	8.5	1	I	
31	TS	2	140	0.	2	J	C	N	9	1	20	21	20	15.	15.	1	52	30	30	5.	5.	1	O
31	TS	2	140	0.	2	J	C	N	9	1	11	11	31	2.	2.	1	41	38	33	3.	3.	1	O
31	TS	2	140	0.	2	J	C	N	9	1	22	31	31	8.	8.	1	32	25	25	7.5	7.5	1	O
31	PH	3	140	0.	2	J	C	N	9	1	33	31	30	7.5	7.5	1	26	30	30	5.	5.	1	O
31	PH	3	140	0.	2	J	C	N	9	1	26	31	30	5.	5.	1	24	30	30	5.	5.	1	O
31	PH	3	140	0.	2	J	C	N	9	1	21	25	25	7.5	7.5	1	28	33	33	4.	4.	1	O
31	PH	3	141	0.	2	J	C	N	9	1	10	31	30	5.	5.	1	60	33	33	7.	7.	1	O
31	PH	3	141	0.	2	J	C	N	9	1	12	27	27	6.5	6.5	1	20	33	33	4.5	4.5	1	O
31	PH	3	140	0.	2	J	C	N	9	1	12	25	25	6.5	6.5	1	40	30	30	5.5	5.5	1	O
31	TS	2	140	0.	2	J	C	N	9	1	21	31	30	5.	5.	1	50	33	33	2.	2.	1	O
31	TS	2	140	0.	2	J	C	N	9	1	32	32	32	2.5	2.5	1	56	40	40	2.	2.	1	O
31	TS	2	140	0.	2	J	C	N	9	1	25	32	32	0.	0.	1	32	34	34	0.	0.	1	O
31	TS	2	140	0.	2	J	C	N	9	1	30	28	28	2.5	2.5	1	50	30	30	0.	0.	1	O
31	TS	2	140	0.	2	J	C	N	9	1	37	31	31	2.5	2.5	1	20	34	34	7.5	7.5	1	O
31	TS	2	141	0.	2	J	C	N	9	1	24	24	24	3.	3.	1	50	30	30	5.	5.	1	O
31	PH	3	170	11.	2	C	N	1	1	25	41	40	2.5	2.5	1	32	33	30	2.5	2.5	1	I	
31	PH	3	170	11.	2	C	N	1	1	21	21	27	5.	5.	1	25	25	25	6.	6.	1	I	
31	PH	3	170	11.	2	C	N	1	1	30	45	45	0.	0.	1	20	40	40	1.5	2.	1	I	
31	PH	3	170	11.	2	C	N	1	1	51	45	45	3.5	3.5	1	28	39	39	4.	4.	1	I	
31	PH	3	170	11.	2	C	N	1	1	32	71	56	1.5	2.	1	23	63	68	1.5	1.5	1	I	
31	PH	3	170	11.	2	C	N	1	1	29	51	75	2.	2.5	1	20	55	55	1.	1.	1	I	
31	PH	3	170	11.	2	C	N	1	1	49	75	85	0.	1.	2							I	
31	TS	3	210	0.	0	C	F	9	3	15	28	29	1.	1.	1	25	42	42	7.5	7.5	1	O	
31	TS	3	200	0.	0	C	F	9	3	15	27	27	3.	3.	1	35	50	50	3.	3.	1	O	
31	PH	3	201	0.	0	C	F	9	3	15	25	25	5.	5.	1	32	80	80	7.	7.	1	O	
31	PH	3	200	0.	0	C	F	9	3	21	73	75	0.	0.	1	25	90	90	6.5	6.5	1	O	
31	PH	3	200	0.	0	C	F	9	3	21	52	52	4.	4.	1	32	90	90	10.	10.	1	O	
31	PH	3	192	0.	3	C	F	7	3	13	46	46	1.	1.	1	7	70	70	1.5	1.5	1	O	
31	PH	3	195	0.	3	C	F	7	3	4	61	60	0.	0.	2							O	
31	PH	3	195	0.	3	C	F	7	3	1	47	47	2.1	2.5	2							O	
31	PH	3	195	0.	3	C	F	7	3	5	40	53	0.	0.	1	5	78	78	2.5	2.5	1	O	
31	PH	3	195	0.	3	C	F	7	3	17	72	72	3.	3.	1	17	72	72	3.	3.	1	O	
31	HT	1	190	1.5	4	C	N	3	1	25	49	48	1.5	1.5	1	61	40	40	1.5	2.	1	C	
31	HT	1	199	1.5	4	C	N	3	1	40	49	46	0.	1.2	1	57	52	52	0.	1.	2	C	
31	HT	1	191	1.5	4	C	N	3	1	22	46	46	2.	2.	1	60	48	48	0.	0.	1	C	
31	PH	3	190	1.5	4	C	N	3	1	15	25	25	1.	1.5	1	46	31	31	1.5	1.5	1	C	
31	PH	3	190	1.5	4	C	N	3	3	23	25	26	5.5	7.5	1	33	23	23	4.5	4.5	1	C	
31	PH	3	190	1.5	4	C	N	3	3	11	31	30	12.5	14.5	1	38	26	26	12.0	12.0	1	C	
31	PH	3	190	0.	3	C	N	7	3	11	47	47	1.	1.	1	18	62	52	0.	0.	1	O	
31	PH	3	190	0.	3	C	N	7	3	3	35	35	0.	0.	1	13	62	52	1.	1.	1	O	
31	PH	3	175	0.	3	C	N	8	3	21	52	62	2.1	2.5	1	52	72	72	1.	2.	1	C	
31	PH	3	175	0.	3	C	N	8	3	41	72	72	6.	9.	1	71	70	71	5.	5.5	1	C	
31	PH	3	175	0.	3	C	N	8	3	14	43	48	1.	2.5	1	32	50	50	2.	4.	1	C	
31	PH	3	175	0.	3	C	N	8	3	32	52	52	1.5	2.	1	67	62	52	2.5	3.5	1	C	

3T PH 2 175	4.	3	C	G	8	3	15	38	58	3.	4.	1	42	40	40	2.5	3.	1	C
3T HT 1 190	1.5	4	C	N	3	3	13	50	51	1.5	4.5	1	39	65	65	1.	4.	1	C
3T HT 1 190	1.5	4	C	N	3	3	10	59	59	2.	1.	1	45	50	50	.5	2.5	1	C
3T HT 2 190	1.5	4	C	N	3	3	12	61	60	1.	4.	1	47	48	48	.5	1.	1	C
3T HT 2 190	2.	4	C	N	5	3	12	21	21	0.	.5	1	62	36	36	0.	0.	1	D
3T HT 2 190	2.	4	C	N	5	3	12	44	48	1.5	1.5	1	16	36	36	.5	.5	1	D
3T HT 2 190	2.	4	C	N	5	3	20	48	48	2.	2.	1	30	56	56	0.	4.	1	D
3T HT 2 190	5.	3	C	N	3	3	18	24	26	2.	2.	1	14	45	45	1.	1.	2	D
3T HT 2 190	5.	3	C	N	3	3	11	30	30	3.1	3.5	1	22	35	35	3.	3.	2	D
3T HT 2 190	5.	3	C	N	3	3	11	22	22	3.3	3.5	1	22	40	40	3.5	3.5	2	D
3T PH 2 190	2.	4	C	N	5	3	20	20	20	1.	1.5	1	60	29	29	0.	1.5	1	D
3T PH 2 190	2.	4	C	N	5	3	16	25	25	1.5	2.5	1	38	28	28	0.	.5	1	D
3T HT 1 190	5.	3	C	N	3	3	21	61	60	4.5	4.5	1	25	50	50	2.5	2.5	1	D
3T HT 1 190	5.	3	C	N	3	3	21	59	58	1.5	1.5	1	38	38	38	1.5	1.5	2	D
3T HT 1 190	5.	3	C	N	3	3	20	51	51	5.5	5.5	1	20	60	60	2.5	2.5	2	D
3T HT 3 190	2.	4	C	N	5	3	22	38	38	2.5	3.	1	23	46	46	1.	1.	1	D
3T HT 3 190	2.	4	C	N	5	3	21	30	30	2.4	2.5	1	46	46	46	1.	2.5	1	D
3T HT 3 190	2.	4	C	N	5	3	8	44	44	2.5	5.	1	14	81	81	0.	4.5	1	D
3T HT 2 190	1.5	4	C	N	3	3	18	33	33	5.5	5.5	1	18	39	39	3.5	5.	2	C
3T HT 2 190	1.5	4	C	N	3	3	17	30	35	4.	8.5	1	20	43	43	3.5	4.5	1	C
3T HT 2 190	1.5	4	C	N	3	3	16	30	30	2.	3.5	1	30	37	37	.5	3.	1	C
3T TS 3 195	1.	3	C	N	6	3	21	34	38	0.	.5	1	30	40	40	.5	.5	1	D
3T PH 2 180	.1	4	C	G	8	3	22	40	40	6.	7.	1	63	44	44	1.	1.5	1	C
3T PH 2 180	.1	4	C	N	8	3	28	23	28	.5	7.5	1	40	40	40	0.	.5	1	C
3T PH 2 180	.1	4	C	N	8	3	5	28	28	0.	0.	1	44	30	30	1.	1.5	1	C
3T PH 2 180	.1	4	C	N	8	3	32	25	25	0.	.5	1	22	41	41	0.	0.	1	C
3T PH 3 180	.1	4	C	G	8	3	24	47	47	7.	6.5	1	52	25	25	0.	1.5	1	C
3T TS 2 145	1.	3	C	N	6	3	70	32	32	0.	1.	1	72	42	42	1.	1.	1	C
3T TS 2 145	1.	3	C	N	6	3	30	48	48	7.5	8.5	1	45	45	45	8.5	10.5	1	D
3T PH 2 150	.1	4	C	N	7	3	11	20	26	3.5	3.5	1	35	40	40	0.	0.	1	D
3T PH 2 150	.1	4	C	N	7	3	13	25	25	0.	0.	1	28	38	38	.5	.5	1	D
3T PH 2 150	.1	4	C	N	7	3	7	24	24	4.5	4.5	1	25	35	35	4.	4.	1	D
3T PH 2 150	.1	4	C	N	7	3	17	25	25	5.	5.	1	30	35	35	4.5	4.5	1	D
3T PH 1 150	.1	4	C	N	7	3	32	33	38	6.	6.	1	32	47	47	5.5	5.5	1	D
3T PH 1 150	.1	4	C	N	7	3	25	39	39	8.5	8.5	1	40	57	57	8.5	6.5	1	D
3T PH 1 150	.1	4	C	N	7	3	23	35	35	2.5	2.5	1	30	47	47	5.5	5.5	1	D
3T PH 1 150	.1	4	C	N	7	3	22	39	38	6.	6.	1	23	55	55	7.5	7.5	2	D
3T PH 3 150	.1	4	C	N	7	3	40	49	45	1.	1.	1	30	45	45	2.5	2.5	1	D
3T PH 3 150	.1	4	C	N	7	3	27	55	55	3.	3.	1	40	55	55	2.5	2.5	1	D
3T PH 3 150	.1	4	C	N	7	3	40	51	70	10.	10.	2							0
3T PH 3 150	.1	4	C	N	7	3	17	55	55	6.	6.	2							0
3T PH 3 150	.1	4	C	N	7	3	58	50	50	4.5	4.5	2							0
3T PH 2 130	.3	4	C	N	5	3	12	10	10	7.	8.5	1	48	10	10	7.5	7.5	1	D
3T PH 2 130	.3	4	C	N	5	3	11	12	12	2.	2.	1	58	10	10	4.	4.	1	D
3T PH 2 130	.3	4	C	N	5	3	12	12	12	2.5	3.5	1	52	10	10	4.5	4.5	1	D
3T TS 2 170	25.	3	C	F	6	3	25	30	30	3.	4.	1	28	40	40	3.	5.5	1	D
3T TS 2 170	25.	3	C	N	6	3	25	28	28	3.	3.	1	8	30	30	1.	1.	2	D
3T TS 1 170	25.	3	C	N	6	3	15	31	30	3.	3.5	1	68	30	30	5.5	6.	1	D
3T TS 3 170	25.	3	C	N	6	3	35	30	30	2.	2.5	1	35	55	55	2.5	3.	2	D
3T HT 3 190	26.	3	C	N	3	3	12	8	8	7.	7.	1	30	12	12	5.	5.	1	D
3T PH 2 150	.1	4	C	N	7	3	10	30	30	2.5	2.5	1	48	38	38	5.	5.	2	D
3T HT 1 165	25.	3	C	N	3	3	33	52	52	.5	3.	1	28	48	48	0.	.5	1	D
3T HT 1 150	26.	3	C	N	3	3	32	39	39	7.	7.	1	30	36	36	0.	6.	1	D
3T HT 1 150	25.	3	C	N	3	3	26	37	37	3.5	3.5	1	30	41	41	5.5	5.5	1	D
3T HT 1 150	26.	3	C	N	3	3	40	32	32	2.5	2.5	1	30	40	40	3.	3.	1	D
3T HT 1 150	26.	3	C	N	3	3	25	39	39	5.	6.	1	18	34	34	5.5	5.5	2	D
3T HT 2 150	26.	3	C	N	3	3	11	7	7	1.	1.5	1	3	12	12	1.	2.5	1	D
3T HT 2 150	25.	3	C	N	3	3	14	11	11	1.	3.	1	10	15	15	2.	2.	1	D

31	HT	2	190	26.	3	C	N	3	3	28	11	11	4.5	4.5	1	20	17	12	2.5	3.	1	0
31	HT	2	190	26.	3	C	N	3	3	11	18	18	7.5	8.	1	12	20	20	6.5	6.5	1	0
31	HT	2	190	26.	3	C	N	3	3	22	18	18	10.	10.	1	21	20	20	8.5	8.5	1	0
31	HT	2	190	26.	3	C	N	3	3	20	20	20	5.5	6.	1	17	21	21	11.	12.	2	0
31	PH	3	175	4.	3	C	N	A	2	31	61	61	6.	7.	1	58	55	55	8.	8.	1	C
31	PH	3	175	4.	3	C	N	A	2	31	34	34	4.	7.	1	50	51	51	5.	5.5	1	C
31	PH	3	175	4.	3	C	N	A	2	62	87	87	6.	8.5	1	47	55	55	7.5	9.	1	C
31	PH	1	195	8.	3	C	F	7	2	4	41	41	1.	1.	1	20	63	63	1.	1.	1	0
31	PH	1	195	8.	3	C	F	7	2	5	36	36	1.5	1.5	1	23	64	64	1.5	1.5	1	0
31	PH	1	195	8.	3	C	N	7	2	11	53	53	3.	3.	1	18	64	64	2.5	2.5	1	0
31	PH	1	195	8.	3	C	N	7	2	6	53	53	3.	3.	1	10	80	80	2.5	2.5	1	0
31	PH	1	195	8.	3	C	N	7	2	8	33	33	1.	1.	1	12	70	70	2.5	2.5	1	0
31	PH	1	175	4.	3	C	N	A	2	71	91	91	2.	3.	2							C
31	PH	1	175	4.	3	C	N	A	2	12	40	40	3.	5.	1	56	61	61	1.5	1.5	1	C
31	PH	1	175	4.	3	C	N	A	2	4	41	41	3.	5.5	1	61	56	56	4.	4.	1	C
31	PH	1	175	4.	3	C	N	A	2	72	31	31	2.5	6.	2							C
31	PH	1	175	4.	3	C	G	A	2	30	74	74	3.	4.	1	33	78	78	3.	6.	1	C
31	PH	1	175	4.	3	C	G	A	2	19	51	51	2.	3.5	1	47	61	61	2.5	3.5	1	C
31	PH	1	175	4.	3	C	N	A	2	34	66	66	4.5	5.5	1	67	61	61	6.0	6.5	1	C
31	PH	1	175	4.	3	C	N	A	2	8	71	71	2.	2.	1	59	60	60	5.	6.5	1	C
31	PH	1	190	1.5	4	C	N	3	2	31	22	22	0.	0.	1	32	19	14	.5	.5	1	C
31	PH	1	190	1.5	4	C	N	3	2	24	23	23	2.	3.	1	33	24	24	1.	1.5	1	C
31	PH	1	190	1.5	4	C	N	3	2	23	15	15	9.	10.	1	35	18	18	8.	9.	1	C
31	PH	1	195	8.	3	C	F	7	2	12	30	30	1.5	1.5	1	23	51	51	1.5	1.5	1	0
31	PH	2	195	8.	3	C	F	7	2	10	23	23	3.	3.	1	19	60	60	5.5	5.5	1	0
31	PH	2	175	4.	3	C	N	A	2	10	33	33	4.	5.	1	41	41	41	4.	4.5	1	C
31	PH	2	175	4.	3	C	G	A	2	8	71	71	2.5	4.	1	60	55	55	1.	1.	1	C
31	PH	2	175	4.	3	C	N	A	2	9	30	30	2.	2.5	1	51	39	39	2.	2.	1	C
31	PH	2	175	4.	3	C	N	A	2	18	49	49	2.5	5.5	1	63	39	39	6.	13.5	1	C
31	PH	2	175	4.	3	C	N	A	2	11	48	48	2.5	5.	1	29	48	48	2.	2.	1	C
31	PH	2	175	4.	3	C	G	A	2	31	15	15	5.	5.	1	40	45	45	2.	2.	1	C
31	PH	2	175	4.	3	C	G	A	2	7	50	50	2.	2.	1	50	52	52	3.	3.	1	C
31	HT	1	190	1.5	4	C	N	3	2	25	45	45	1.	2.	1	52	49	49	0.	1.	1	C
31	HT	1	190	1.5	4	C	N	3	2	41	49	49	1.	2.	1	63	45	45	0.	0.	1	C
31	HT	1	190	1.5	4	C	N	3	2	52	50	50	0.	1.5	1	71	51	51	1.	1.	1	C
31	PH	1	190	2.	4	C	N	5	2	8	69	68	3.5	4.	1	40	40	40	2.5	2.5	1	0
31	PH	1	150	2.	4	C	N	5	2	18	78	78	3.	3.	1	45	79	79	2.	2.	1	0
31	HT	1	165	5.	3	C	N	3	2	12	51	51	1.5	1.5	1	41	51	51	3.	3.	1	0
31	HT	1	165	5.	3	C	N	3	2	22	44	44	2.5	2.5	1	20	60	60	3.	3.	2	0
31	HT	1	165	5.	3	C	N	3	2	19	50	50	2.	2.	1	15	46	46	4.	4.	2	0
31	HT	3	150	2.	4	C	N	5	2	20	19	19	2.	2.5	1	32	34	34	1.	1.	1	0
31	HT	3	150	2.	4	C	N	5	2	11	19	19	1.	1.	1	31	51	51	2.	2.5	1	0
31	HT	3	150	2.	4	C	N	5	2	20	31	31	3.	3.	1	41	47	47	3.5	3.5	1	0
31	HT	3	165	5.	3	C	N	3	2	21	23	23	1.5	1.5	1	36	25	25	2.	2.	1	0
31	HT	3	165	5.	3	C	N	3	2	34	30	30	2.5	2.5	1	10	21	21	2.	2.	2	0
31	HT	3	150	2.	4	C	N	5	2	21	31	31	3.	3.	1	44	27	27	2.5	2.5	1	0
31	HT	2	190	1.5	4	C	N	3	2	10	35	35	7.	7.	1	25	36	36	5.	6.5	1	C
31	HT	2	190	1.5	4	C	N	3	2	23	30	30	5.	6.	1	26	35	35	3.5	5.5	1	C
31	HT	2	190	1.5	4	C	N	3	2	21	37	37	8.5	4.5	1	12	36	36	2.	7.5	2	C
31	HT	2	150	2.	4	C	N	5	2	13	24	24	1.	1.5	1	56	36	36	1.5	1.5	1	0
31	HT	2	150	2.	4	C	N	5	2	19	30	30	1.5	2.	1	60	40	40	0.	1.5	1	0
31	HT	2	165	5.	3	C	N	3	2	31	32	32	2.5	2.5	1	58	32	32	3.5	3.5	1	0
31	HT	2	165	5.	3	C	N	3	2	17	30	30	1.	1.	1	65	36	36	0.	0.	1	0
31	HT	2	165	5.	3	C	N	3	2	24	28	28	3.5	3.5	1	54	36	36	4.5	4.5	1	0
31	PH	2	150	2.	4	C	N	5	2	12	29	29	3.5	3.5	1	51	38	38	2.	2.	1	0
31	PH	2	150	2.	4	C	N	5	2	18	21	21	1.	1.	1	75	30	30	2.	2.	1	0
31	PH	3	195	1.	3	C	N	6	2	32	12	12	2.5	3.	1	25	20	20	2.	2.	1	C
31	PH	3	195	1.	3	C	N	6	2	22	12	12	2.	2.	1	33	20	20	2.	2.5	1	0

31 TS	3 145	1.	3	C	N	6	2	26	23	24	.5	1.	1	40	27	27	2.	2.5	1	0
31 TS	1 145	1.	3	C	N	6	2	5	45	45	1.	1.5	1	63	45	45	.5	2.5	1	0
31 TS	1 145	1.	3	C	N	6	2	3	33	33	0.	2.	1	50	40	40	2.5	2.5	1	0
31 PH	2 180	.1	4	C	G	8	2	41	41	40	1.	3.	1	45	45	45	2.	2.	1	0
31 PH	2 180	.1	4	C	G	8	2	13	50	50	2.5	3.	1	43	50	50	0.	2.5	1	0
31 PH	2 180	.1	4	C	G	8	2	41	45	45	7.5	7.5	1	48	50	50	6.	6.	1	0
31 PH	2 180	.1	4	C	G	8	2	33	45	48	1.	2.5	1	63	58	58	1.	1.5	1	0
31 PH	2 180	.1	4	C	N	6	2	11	21	21	2.	3.	1	53	43	43	2.5	3.	1	0
31 PH	2 180	.1	4	C	N	6	2	30	30	30	1.	1.	1	61	32	32	1.	0.	1	0
31 PH	2 180	.1	4	C	N	6	2	3	36	36	0.	1.	1	41	31	31	.5	1.	1	0
31 PH	1 15	.1	4	C	G	8	2	44	63	63	2.5	3.5	1	30	44	44	5.	6.	1	0
31 PH	1 135	.1	4	C	G	8	2	28	61	61	0.	2.	1	43	53	53	3.5	4.5	1	0
31 PH	1 180	.1	4	C	G	8	2	38	55	55	4.5	5.5	1	51	49	49	5.	6.5	1	0
31 PH	1 180	.1	4	C	F	8	2	12	37	57	0.	4.	1	63	52	52	2.	3.5	1	0
31 TS	2 145	1.	3	C	N	6	2	22	22	22	2.	2.	1	38	22	22	.5	1.	1	0
31 TS	2 145	1.	3	C	N	6	2	21	31	30	3.5	3.5	1	50	21	21	1.	1.	1	0
31 TS	2 145	1.	3	C	N	6	2	40	25	25	2.	2.	1	35	30	30	1.5	2.5	1	0
31 TS	2 145	1.	3	C	N	6	2	43	25	25	.5	.5	1	60	30	30	0.	.5	1	0
31 TS	2 145	1.	3	C	N	6	2	41	27	27	.5	.5	1	41	24	24	.5	1.	1	0
31 TS	2 145	1.	3	C	N	6	2	12	23	28	1.5	2.	1	30	22	22	4.5	4.5	1	0
31 TS	2 145	1.	3	C	N	6	2	23	20	20	5.5	5.5	1	55	25	25	5.	5.5	1	0
31 TS	2 145	1.	3	C	N	6	2	10	15	15	5.	5.	1	52	28	28	2.5	2.5	1	0
31 TS	2 145	1.	3	C	N	6	2	23	31	31	4.	4.	1	38	45	45	2.	5.	1	0
31 TS	2 145	1.	3	C	N	6	2	9	25	25	4.5	4.5	1	35	32	32	6.5	6.5	1	0
31 PH	2 150	.1	4	C	N	7	2	7	15	15	11.5	11.5	1	22	35	35	.0	.0	1	0
31 PH	2 150	.1	4	C	N	7	2	3	15	15	1.5	1.5	1	27	40	30	7.5	7.5	1	0
31 PH	2 150	.1	4	C	N	7	2	10	17	17	4.5	4.5	1	18	33	33	6.	6.	1	0
31 PH	2 150	.1	4	C	N	7	2	5	17	17	5.	5.	1	28	38	38	9.	9.	1	0
31 PH	2 150	.1	4	C	N	7	2	5	17	17	5.	5.	1	13	27	27	2.5	2.5	1	0
31 PH	2 150	.1	4	C	N	7	2	10	33	30	1.5	1.5	1	62	42	42	0.	0.	1	0
31 PH	2 150	.1	4	C	N	7	2	15	25	25	1.5	1.5	1	45	35	35	0.	0.	1	0
31 PH	2 150	.1	4	C	N	7	2	13	25	25	5.	5.	1	45	35	35	3.5	3.5	1	0
31 PH	1 150	.1	4	C	N	7	2	11	21	20	7.	7.	1	35	45	45	7.	7.	1	0
31 PH	1 150	.1	4	C	N	7	2	11	33	33	5.	5.	1	32	55	52	8.	8.	1	0
31 PH	1 150	.1	4	C	N	7	2	25	32	32	5.5	5.5	1	34	45	45	10.	10.	1	0
31 PH	1 150	.1	4	C	N	7	2	25	34	34	7.5	7.5	1	34	49	49	8.	8.	2	0
31 PH	1 130	.3	4	C	N	5	2	12	10	10	5.	9.5	1	41	10	10	4.	5.	0	0
31 PH	1 130	.3	4	C	N	5	2	15	12	12	2.5	4.5	1	42	12	12	3.	13.	0	0
31 PH	2 135	.3	4	C	N	5	2	12	15	15	1.5	2.5	1	68	5	5	2.	2.	1	0
31 PH	2 135	.3	4	C	N	5	2	12	15	15	1.5	2.5	1	58	6	6	.5	6.5	1	0
31 TS	2 170	25.	3	C	N	6	2	32	32	32	2.	2.	1	30	28	28	4.5	4.5	1	0
31 TS	2 170	25.	3	C	N	6	2	52	23	28	1.	1.	1	38	22	22	2.	2.5	1	0
31 TS	2 170	25.	3	C	N	6	2	58	26	26	4.	4.	1	45	25	25	2.5	2.5	1	0
31 TS	1 170	25.	3	C	N	6	2	21	32	32	2.	2.	1	55	32	32	2.	2.	1	0
31 TS	1 170	25.	3	C	N	6	2	12	25	25	7.5	7.5	1	60	25	25	7.	7.	1	0
31 TS	1 170	25.	3	C	N	6	2	15	31	30	2.	5.	1	65	30	30	5.	5.	1	0
31 TS	1 170	25.	3	C	N	6	2	8	20	20	2.5	2.5	1	39	12	12	0.	.5	1	0
31 TS	1 170	25.	3	C	N	6	2	3	15	15	4.	4.	1	40	15	15	2.5	2.5	1	0
31 TS	1 170	25.	3	C	N	6	2	13	15	15	3.	3.	1	50	12	12	3.	3.	1	0
31 TS	1 170	25.	3	C	N	6	2	18	12	12	3.5	2.5	1	40	12	12	2.5	3.	1	0
31 PH	1 170	11.	3	C	N	1	2	11	40	40	3.5	3.5	1	15	36	30	3.5	3.5	1	1
31 PH	1 170	11.	3	C	N	1	2	4	39	39	3.5	3.5	1	15	33	33	3.5	3.5	1	1
31 PH	1 170	11.	3	C	N	1	2	27	41	40	2.	2.	1	30	36	36	3.	3.	1	1
31 TS	3 170	25.	3	C	N	6	2	22	21	21	1.5	1.5	1	28	22	22	1.	1.5	1	0
31 TS	3 170	25.	3	C	N	6	2	42	22	22	1.	1.5	1	55	12	12	2.5	3.5	1	0
31 TS	3 170	25.	3	C	N	6	2	32	31	31	2.	2.	1	31	26	26	.5	1.	1	0
31 HT	2 150	26.	3	C	N	3	2	13	21	21	5.	5.	1	24	21	21	2.5	2.5	1	0
31 HT	3 150	25.	3	C	N	3	2	21	20	20	2.	2.	1	21	21	21	1.	2.	1	0

31	HT	1	150	26.	3	C	N	3	2	18	28	24	2.	2.	1	20	26	26	1.5	1.5	1	0
31	HT	1	150	26.	3	C	N	3	2	11	26	24	1.	3.	1	24	25	24	0.	0.	1	0
31	HT	1	150	26.	3	C	N	3	2	12	26	26	3.	3.	1	25	24	24	2.5	7.5	1	0
31	HT	1	150	26.	3	C	N	3	2	4	12	12	0.5	6.5	1	24	12	12	4.	4.	1	0
31	HT	1	150	26.	3	C	N	3	2	31	41	43	2.5	2.5	1	50	46	46	3.	3.	1	0
31	HT	1	150	26.	3	C	N	3	2	54	34	34	2.	2.	1	32	41	41	5.	5.	2	0
31	HT	1	150	26.	3	C	N	3	2	26	34	34	5.5	5.5	1	32	41	41	5.5	6.	1	0
31	HT	1	150	26.	3	C	N	3	2	32	33	34	5.5	5.5	1	2	24	24	5.5	5.5	2	0
31	HT	2	150	26.	3	C	N	3	2	33	11	13	4.	4.	1	35	18	18	3.5	4.	1	0
31	HT	2	150	26.	3	C	N	3	2	12	11	10	5.	5.	1	36	15	15	3.5	3.5	1	0
31	HT	2	150	26.	3	C	N	3	2	13	23	20	1.5	1.5	1	24	15	15	3.5	4.	1	0
31	HT	2	150	26.	3	C	N	3	2	12	12	12	1.	2.2	1	24	16	14	4.	5.2	1	0
31	HT	2	150	26.	3	C	N	3	2	26	12	12	3.5	4.	1	24	15	15	7.5	7.5	1	0
31	HT	2	150	26.	3	C	N	3	2	13	13	12	10.	11.	1	12	12	12	7.5	8.5	1	0
31	HT	2	150	26.	3	C	N	3	2	12	42	42	0.	0.	1	46	52	52	0.	0.	1	0
31	HT	1	150	26.	3	C	N	3	2	34	31	33	2.	2.	1	24	45	45	0.	0.	1	0
31	HT	1	150	26.	3	C	N	3	2	14	51	51	1.	1.5	1	32	45	45	0.	0.	1	0
31	PH	2	175	4.	3	C	F	7	1	31	51	51	5.	11.	1	36	52	52	11.	11.	1	0
31	PH	3	175	4.	3	C	G	4	1	12	55	65	7.5	8.	1	36	41	41	8.5	8.5	1	0
31	PH	2	175	4.	3	C	F	7	1	28	23	55	7.5	7.5	1	46	51	51	8.	8.	2	0
31	PH	3	175	4.	3	C	F	7	1	8	37	37	2.5	2.5	1	17	60	60	3.	3.	1	0
31	PH	3	175	4.	3	C	F	7	1	12	43	50	1.5	1.5	1	29	73	73	1.	1.	1	0
31	PH	3	175	4.	3	C	F	7	1	16	48	48	0.	0.	1	22	60	60	0.	0.	1	0
31	PH	3	175	4.	3	C	F	7	1	25	35	30	0.	0.	1	25	54	54	0.	0.	1	0
31	PH	3	175	4.	3	C	F	7	1	8	51	56	0.	0.	1	23	64	64	1.5	1.5	1	0
31	PH	3	175	4.	3	C	F	7	1	11	51	58	0.	0.	1	23	72	72	0.	0.	1	0
31	PH	2	190	4.	3	C	F	7	1	17	55	65	2.5	2.5	1	22	73	73	0.	0.	1	0
31	PH	1	190	4.	3	C	N	7	1	20	50	50	2.5	2.5	1	30	70	70	1.	1.	1	0
31	PH	1	190	4.	3	C	N	7	1	17	43	49	2.	2.	1	39	70	70	0.5	0.5	1	0
31	PH	1	190	4.	3	C	N	7	1	20	53	53	0.	0.	1	22	72	72	2.	2.	1	0
31	PH	1	190	4.	3	C	N	7	1	14	55	55	0.	0.	1	23	76	76	0.	0.	1	0
31	PH	1	190	4.	3	C	N	7	1	18	75	75	2.	2.	1	30	70	70	2.5	2.5	1	0
31	PH	1	190	4.	3	C	N	7	1	16	73	70	0.	0.	1	24	70	70	1.	1.	1	0
31	PH	2	195	4.	3	C	N	7	1	5	41	41	2.5	2.5	1	13	50	50	2.5	2.5	1	0
31	PH	1	195	4.	3	C	N	7	1	13	40	40	0.	0.	1	23	74	74	0.5	0.5	1	0
31	PH	1	195	4.	3	C	N	7	1	17	47	47	1.	1.	1	24	60	60	1.5	1.5	1	0
31	PH	1	195	4.	3	C	N	7	1	31	33	30	5.	13.	1	36	21	21	7.5	8.5	1	0
31	PH	1	195	4.	3	C	N	7	1	30	32	32	11.5	11.5	1	36	22	22	7.5	8.	1	0
31	PH	1	195	4.	3	C	N	7	1	35	19	18	0.	0.	1	40	19	19	0.	0.	1	0
31	PH	1	195	4.	3	C	N	7	1	12	30	64	2.	2.	1	37	75	75	1.	1.	1	0
31	PH	1	195	4.	3	C	N	7	1	14	55	55	2.	2.	1	35	70	70	0.	0.	1	0
31	PH	1	195	4.	3	C	N	7	1	11	55	65	3.5	3.5	1	37	61	61	2.5	2.5	1	0
31	PH	1	175	4.	3	C	N	4	1	13	61	61	2.5	6.	1	46	62	62	6.	6.5	1	0
31	PH	1	175	4.	3	C	N	4	1	21	61	61	2.	4.	1	48	64	64	5.	5.	1	0
31	PH	2	175	4.	3	C	N	4	1	83	83	89	6.	6.	2	48	64	64	5.	5.	1	0
31	PH	1	175	4.	3	C	G	3	1	19	52	59	1.	1.5	1	56	65	65	1.	1.5	1	0
31	PH	1	175	4.	3	C	G	8	1	20	71	71	4.	6.	1	41	66	66	3.5	3.5	1	0
31	PH	1	175	4.	3	C	G	8	1	31	61	61	2.5	3.5	1	73	61	61	2.	2.	1	0
31	PH	2	195	4.	3	C	F	7	1	15	49	48	1.5	1.5	1	22	53	53	0.	0.	1	0
31	PH	2	195	4.	3	C	F	7	1	13	49	46	5.	6.	1	24	60	60	0.	0.	1	0
31	PH	2	195	4.	3	C	F	7	1	16	31	51	0.	1.	1	22	70	70	0.	0.	1	0
31	PH	2	195	4.	3	C	F	7	1	13	47	47	1.	1.	1	34	60	60	1.	1.	1	0
31	PH	2	175	4.	3	C	N	4	1	8	36	36	3.5	5.	1	51	35	35	2.	2.	1	0
31	PH	2	175	4.	3	C	N	4	1	9	35	37	2.5	3.	1	43	42	42	1.	1.5	1	0
31	PH	2	175	4.	3	C	N	4	1	12	37	37	0.5	2.	1	51	44	44	1.	2.5	1	0
31	PH	2	175	4.	3	C	G	3	1	21	59	59	1.	1.	1	73	55	55	1.	3.5	1	0
31	PH	2	175	4.	3	C	G	3	1	31	58	58	1.	1.	1	34	55	55	1.5	1.5	1	0
31	PH	2	175	4.	3	C	G	3	1	22	59	58	0.5	0.5	1	45	48	48	1.5	2.	1	0



3T TS 2 170	25.	3	C	N	6	1	55	19	18	4.5	5.	1	62	22	22	0.	1.	1	0
3T HT 2 190	2.	4	C	N	5	1	21	23	27	1.	1.	1	58	24	24	0.	0.	1	0
3T HT 2 190	2.	4	C	N	5	1	15	27	27	.5	2.5	1	54	41	41	1.5	2.	1	0
3T HT 2 190	2.	4	C	N	5	1	17	31	31	1.	2.5	1	52	30	30	1.5	1.5	1	0
3T HT 2 165	5.	3	C	N	3	1	32	23	23	1.5	1.5	1	50	35	35	.5	.5	1	0
3T HT 2 165	5.	3	C	N	3	1	20	23	24	2.	2.5	1	54	36	36	2.5	2.5	1	0
3T PH 2 190	2.	4	C	N	5	1	20	23	24	3.	3.	1	40	48	48	1.5	1.5	1	0
3T PH 2 190	2.	4	C	N	5	1	16	35	35	.5	1.	1	58	38	38	0.	0.	1	0
3T PH 2 190	1.5	4	C	N	3	1	39	36	36	10.	13.5	1	23	52	52	6.	9.5	1	0
3T PH 1 190	2.	4	C	N	5	1	21	42	42	2.5	2.5	1	39	47	47	1.	1.5	1	0
3T PH 1 190	2.	4	C	N	5	1	17	38	38	1.	3.	1	42	72	72	2.	2.	1	0
3T PH 1 190	2.	4	C	N	5	1	15	35	55	3.5	5.5	1	48	81	81	3.5	1.5	1	0
3T HT 1 165	5.	3	C	N	3	1	16	49	48	5.	5.	1	41	62	62	3.5	3.5	1	0
3T HT 1 165	5.	3	C	N	3	1	17	43	45	3.	3.	1	50	45	45	2.5	2.5	1	0
3T HT 1 165	5.	3	C	N	3	1	25	51	51	4.5	4.5	1	55	55	55	4.	4.	2	0
3T HT 3 180	2.	4	C	N	5	1	32	23	24	.5	1.	1	30	64	64	.5	1.	1	0
3T HT 3 190	2.	4	C	N	5	1	28	76	76	3.5	3.5	1	12	61	61	2.	3.	1	0
3T HT 3 170	2.	4	C	N	5	1	20	12	12	1.	3.	1	40	62	62	0.	1.5	1	0
3T HT 2 190	1.5	4	C	N	3	1	32	32	38	8.	9.5	1	7	3.	3.	7.5	10.	1	0
3T HT 2 190	1.5	4	C	N	3	1	31	33	34	1.	7.	1	24	40	40	2.5	7.5	1	0
3T HT 3 165	5.	3	C	N	3	1	11	26	26	2.	2.	1	30	19	19	3.5	3.5	1	0
3T HT 3 165	5.	3	C	N	3	1	14	23	23	5.5	5.5	1	52	29	29	3.	3.	2	0
3T HT 3 165	5.	3	C	N	3	1	12	29	29	1.	1.	1	32	34	34	3.	3.	1	0
3T TS 3 145	1.	3	C	N	6	1	22	18	19	3.5	3.5	1	42	22	22	2.5	2.5	1	0
3T TS 3 145	1.	3	C	N	6	1	25	13	13	1.5	2.5	1	46	30	30	1.5	2.5	1	0
3T TS 3 145	1.	3	C	N	6	1	12	10	10	2.5	2.5	1	40	32	32	2.5	3.	1	0
3T TS 1 145	1.	3	C	N	6	1	5	31	30	3.5	3.5	1	75	38	38	.5	1.	1	0
3T TS 1 145	1.	3	C	N	6	1	5	25	25	6.	6.	1	32	28	28	7.5	7.5	1	0
3T HT 1 140	6.5	3	C	N	3	1	38	18	18	2.5	2.5	1	35	27	27	3.	3.	1	0
3T HT 1 140	6.5	3	C	N	3	1	29	26	26	1.	2.	1	34	26	26	2.	2.	1	0
3T HT 1 140	6.5	3	C	N	3	1	49	14	14	1.5	2.5	1	49	26	26	.5	1.5	1	0
3T HT 1 140	6.5	3	C	N	3	1	31	29	29	1.	3.5	1	53	24	28	1.	3.5	1	0
3T HT 1 140	6.5	3	C	N	3	1	32	36	36	1.	3.5	1	34	33	33	0.	3.	1	0
3T PH 2 180	.1	4	C	G	A	1	48	67	67	3.	3.5	2							C
3T PH 2 180	.1	4	C	G	A	1	15	51	50	3.5	7.5	1	50	30	30	7.	7.	1	0
3T HT 1 195	.2	4	C	N	3	1	39	100	100	4.5	7.	2							C
3T HT 1 195	.2	4	C	N	3	1	31	58	58	1.5	1.5	1	70	48	48	1.5	1.5	1	0
3T HT 1 195	.2	4	C	N	3	1	33	42	42	0.	.5	1	45	38	38	.5	1.	1	0
3T HT 1 195	.2	4	C	N	3	1	40	106	106	1.5	3.	1	51	45	45	.5	2.5	1	0
3T PH 2 190	.1	4	C	N	8	1	10	28	28	0.	0.	1	70	25	25	1.	1.	1	0
3T PH 2 190	.1	4	C	N	8	1	5	23	25	1.	1.5	1	58	25	25	0.	1.	1	0
3T PH 2 180	.1	4	C	N	8	1	10	30	30	0.	2.	1	63	25	25	0.	0.	1	0
3T PH 1 190	.1	4	C	G	A	1	33	43	43	2.5	3.5	1	40	52	52	0.	.5	1	0
3T PH 1 180	.1	4	C	G	A	1	45	51	51	.5	2.	1	50	53	53	.5	2.5	1	0
3T PH 1 190	.1	4	C	G	A	1	38	62	62	2.	4.5	1	50	45	45	3.	4.	1	0
3T PH 1 190	.1	4	C	N	7	1	12	25	25	4.	4.	1	24	30	30	6.5	6.5	1	0
3T PH 2 180	.1	4	C	F	A	1	12	35	35	5.	5.	1	52	40	40	3.	4.	1	0
3T PH 1 190	.1	4	C	F	A	1	17	50	5.	8.	10.	1	42	58	58	7.5	9.	1	0
3T PH 1 180	.1	4	C	F	A	1	8	59	39	6.5	4.	1	70	65	65	2.5	7.	1	0
3T PH 1 180	.1	4	C	F	A	1	19	58	58	5.	5.	1	57	50	50	1.5	5.	1	0
3T PH 1 180	.1	4	C	F	A	1	35	52	55	6.	6.5	1	70	55	55	4.5	6.5	1	0
3T PH 3 180	.1	4	C	G	A	2	2.	42	42	.5	2.5	1	43	28	28	2.5	2.5	1	0
3T PH 3 190	.1	4	C	G	A	2	18	43	40	1.	2.5	1	38	28	28	2.	3.	1	0
3T PH 3 190	.1	4	C	G	A	2	18	43	40	2.	2.	1	41	28	28	0.	1.	1	0
3T PH 3 190	.1	4	C	G	A	1	32	52	52	2.5	3.	1	51	31	31	1.	1.5	1	0
3T PH 3 190	.1	4	C	G	A	1	14	31	31	.5	1.5	1	39	22	22	1.5	1.5	1	0
3T PH 3 140	.1	4	C	G	A	1	31	33	33	.5	.5	1	50	20	20	0.	6.	1	0

31	HT	2	147	6.5	3	C	N	3	1	19	13	15	2.5	2.5	1	47	10	10	2.5	4.0	1	C
31	HT	2	148	6.5	3	C	N	3	1	23	11	15	4.0	4.5	1	30	17	15	1.5	1.5	1	C
31	HT	2	149	6.5	3	C	N	3	1	23	17	15	5.0	4.0	1	51	7	7	3.0	3.0	1	C
31	TS	2	145	1.0	3	C	N	6	1	21	21	25	1.5	2.5	1	22	28	28	1.5	1.5	1	D
31	TS	2	145	1.0	3	C	N	6	1	33	25	25	2.0	2.0	1	40	32	32	4.0	4.0	1	D
31	TS	2	145	1.0	3	C	N	6	1	32	23	23	1.5	1.5	1	45	28	28	5.5	5.5	1	D
31	TS	2	145	1.0	3	C	N	6	1	29	32	32	2.5	2.5	1	35	29	29	2.0	2.0	1	D
31	TS	2	145	1.0	3	C	N	6	1	52	22	22	8.0	6.0	1	72	30	30	1.5	1.5	1	D
31	TS	2	145	1.0	3	C	N	6	1	1	31	31	7.0	7.0	1	30	34	36	3.0	3.0	1	D
31	TS	2	145	1.0	3	C	N	6	1	4	27	27	7.0	7.0	1	28	30	30	7.5	8.0	1	D
31	TS	2	145	1.0	3	C	N	6	1	19	23	26	6.0	6.0	1	31	30	30	4.0	4.0	1	D
31	TS	2	145	1.0	3	C	N	6	1	12	31	31	1.0	1.0	1	39	32	32	1.5	2.0	1	D
31	TS	2	145	1.0	3	C	N	6	1	32	34	34	5.0	5.0	1	30	35	35	0.0	0.5	1	D
31	TS	2	145	1.0	3	C	N	6	1	30	33	35	2.5	3.0	1	45	42	42	3.0	2.0	1	D
31	TS	2	145	1.0	3	C	N	6	1	30	33	30	3.0	3.0	1	47	20	20	0.5	0.5	1	D
31	TS	2	145	1.0	3	C	N	6	1	32	31	30	2.0	2.0	1	51	28	28	2.5	2.5	1	D
31	TS	2	145	1.0	3	C	N	6	1	7	32	32	5.0	7.5	1	19	39	39	3.0	3.0	1	D
31	PH	3	150	0.1	4	C	N	7	1	5	11	10	5.0	4.0	1	17	31	33	5.0	5.5	1	D
31	PH	3	150	0.1	4	C	N	7	1	6	13	13	11.0	11.0	1	24	27	25	8.0	8.0	1	D
31	PH	3	150	0.1	4	C	N	7	1	5	14	14	5.0	5.0	1	23	18	18	5.0	5.0	1	D
31	PH	3	150	0.1	4	C	N	7	1	4	17	17	10.0	1.0	1	15	35	35	6.0	6.0	1	D
31	PH	3	150	0.1	4	C	N	7	1	7	15	13	5.0	5.0	1	29	41	40	1.0	1.0	1	D
31	PH	3	150	0.1	4	C	N	7	1	10	13	18	5.0	5.0	1	36	45	45	5.0	5.0	1	D
31	PH	3	150	0.1	4	C	N	7	1	13	9	8	5.0	5.0	1	27	32	32	4.5	4.5	1	D
31	PH	3	150	0.1	4	C	N	7	1	11	17	17	5.0	5.0	1	26	50	53	5.0	5.0	1	D
31	PH	3	150	0.1	4	C	N	7	1	9	22	25	2.5	2.5	1	30	42	42	6.0	6.0	1	D
31	PH	3	150	0.1	4	C	N	7	1	7	13	13	5.0	5.0	1	28	43	43	5.0	5.0	1	D
31	PH	3	150	0.1	4	C	N	7	1	18	15	15	2.5	5.5	1	15	20	20	7.5	7.5	1	D
31	PH	1	130	0.3	4	C	N	5	1	66	19	19	4.0	4.0	2							D
31	PH	1	131	0.3	4	C	N	5	1	22	32	32	1.5	2.5	2							D
31	PH	1	130	0.3	4	C	N	5	1	33	17	15	4.5	5.5	1	40	15	15	5.0	5.5	1	D
31	PH	1	130	0.3	4	C	N	5	1	42	16	16	7.0	7.0	1	32	12	12	7.0	7.5	1	D
31	PH	2	130	0.3	4	C	N	5	1	42	10	10	2.5	3.5	1	64	10	15	2.5	3.5	1	D
31	TS	2	171	25.0	3	C	F	6	1	35	41	41	1.0	1.0	1	35	41	41	5.0	5.0	1	D
31	TS	2	173	25.0	3	C	F	6	1	20	24	28	3.0	3.0	1	35	22	22	1.5	1.5	1	D
31	TS	2	173	25.0	3	C	F	6	1	42	28	28	5.0	1.0	1	60	28	28	2.0	2.0	1	D
31	TS	2	173	25.0	3	C	F	6	1	60	30	30	2.0	2.0	1	40	30	30	1.0	1.0	1	D
31	TS	2	173	25.0	3	C	F	6	1	43	31	30	1.5	1.5	1	55	30	30	6.0	6.0	1	D
31	TS	2	170	25.0	3	C	N	6	1	42	22	22	2.5	2.5	1	52	20	20	4.0	4.0	1	D
31	TS	1	174	25.0	3	C	N	6	1	30	30	30	4.0	4.0	1	45	25	25	3.5	3.5	1	D
31	TS	1	173	25.0	3	C	N	6	1	25	20	20	2.5	2.5	1	70	32	32	4.0	4.5	1	D
31	TS	1	170	25.0	3	C	N	6	1	14	33	35	9.0	1.5	1	53	32	32	4.5	4.5	1	D
31	TS	1	173	25.0	3	C	N	6	1	11	25	25	5.0	5.0	1	43	25	25	2.5	2.5	1	D
31	TS	1	173	25.0	3	C	N	6	1	10	22	22	4.5	4.5	1	34	22	22	2.5	2.5	1	D
31	TS	1	170	25.0	3	C	N	6	1	12	26	26	3.0	3.0	1	33	15	15	2.0	2.0	1	D
31	TS	1	174	25.0	3	C	N	6	1	3	21	22	5.0	5.0	1	35	12	12	5.0	5.5	1	D
31	PH	1	173	11.0	3	C	N	1	1	31	48	48	2.3	3.0	1	28	45	45	4.0	4.0	1	I
31	PH	1	174	11.0	3	C	N	1	1	22	45	43	3.0	3.0	1	41	45	30	1.5	1.5	1	I
31	PH	1	173	11.0	3	C	N	1	1	10	30	40	5.0	5.5	1	36	42	42	7.0	7.5	1	I
31	PH	1	173	11.0	3	C	N	1	1	12	38	33	5.0	5.5	1	29	45	45	3.5	3.5	1	I
31	PH	1	173	11.0	3	C	N	1	1	23	35	35	5.5	7.0	1	39	40	40	6.0	6.0	1	I
31	PH	1	174	11.0	3	C	N	1	1	27	35	35	10.0	11.0	1	32	50	50	6.0	6.0	1	I
31	PH	1	172	11.0	3	C	N	1	1	23	40	40	4.0	4.0	1	30	40	40	5.5	5.5	1	I
31	PH	1	173	11.0	3	C	N	1	1	12	30	41	7.0	7.0	1	30	40	40	5.0	5.0	1	I
31	PH	1	173	11.0	3	C	N	1	1	22	35	35	6.0	6.0	1	30	41	40	6.0	6.0	1	I
31	PH	1	172	11.0	3	C	N	1	1	32	32	40	5.0	5.0	1	28	50	50	0.0	6.0	1	I
31	TS	2	173	25.0	3	C	F	6	1	28	22	22	1.0	1.0	1	41	12	12	1.5	1.5	1	D
31	TS	2	173	25.0	3	C	N	6	1	14	13	19	1.5	1.5	1	40	12	12	2.5	2.5	1	D

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31 TS 3 170 25. 1 C N 6 1 28 12 12 1.5 1.5 1 61 10 10 2. 2. 1 0
31 HT 3 150 25. 1 C N 3 1 30 17 17 3.5 4. 1 25 12 12 5. 7. 1 0
31 HT 3 150 25. 1 C N 3 1 31 17 17 3.5 4. 1 25 12 12 5. 7. 1 0
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31 HT 2 150 25. 1 C N 3 1 40 14 14 3. 4. 1 30 19 19 3.5 3.5 1 0
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31 HT 2 150 25. 1 C N 3 1 42 13 13 3. 3. 1 38 12 12 2. 2. 1 0
31 HT 2 150 25. 1 C N 3 1 19 11 11 1. 1. 1 40 10 10 2. 2.5 1 0
31 HT 2 150 25. 1 C N 3 1 32 14 14 2. 2. 1 25 8 8 4. 4. 1 0
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31 HT 2 150 25. 1 C N 4 1 22 16 16 10. 11. 1 22 18 18 9. 9.5 1 0
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31 HT 2 150 25. 1 C N 3 1 11 13 13 1.5 1.5 1 40 18 18 4. 5. 1 0
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31 HT 1 150 25. 1 C N 3 1 40 41 41 2.5 2.5 1 44 50 50 2.5 2.5 1 0
31 HT 1 150 25. 1 C N 3 1 40 43 43 3. 3. 1 48 50 50 3. 3. 1 0
31 PH 3 175 4. 1 C N 8 3 17 82 82 8. 8. 1 22 61 61 7.5 7.5 1 C
31 PH 3 175 4. 1 C N 5 3 78 94 94 6.5 7.5 2 1 C
31 PH 2 150 4. 1 C N 7 1 7 31 31 4. 4. 1 48 40 40 2. 2. 1 0
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31 PH 1 150 4. 1 C N 7 1 13 25 25 1. 1. 1 62 40 40 4. 4. 1 0
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31 TS 1 120 4. 3 C N 5 3 33 50 50 10. 10.5 1 65 45 45 11.5 11.5 2 0
31 TS 1 120 4. 3 C N 6 3 23 25 25 4.5 4.5 1 40 35 35 6. 6. 1 0
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31 TS 3 140 4. 5 C N 6 2 32 30 30 1.5 2.5 1 45 32 32 1. 1. 1 0
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31 TS 2 140 4. 5 C N 6 2 31 25 25 1. 2.5 1 20 20 20 1.5 2.5 2 0

31 TS	2 140	4.	5	C	N	6	2	22	24	24	1.	1.	1	28	24	24	.5	1.	2	0		
31 TS	2 141	4.	5	C	N	6	2	41	22	22	2.5	2.5	1	40	32	32	1.	1.5	2	0		
31 TS	3 123	4.	5	C	N	6	2	31	12	12	5.	7.	1	20	12	12	7.	7.	1	0		
31 TS	3 120	4.	5	C	N	6	2	11	1	1	5.5	5.5	1	25	25	25	5.	5.	2	0		
31 TS	3 121	4.	5	C	N	6	2	20	15	15	5.5	5.5	1	19	17	17	10.	10.	1	0		
31 TS	1 12	4.	5	C	N	6	2	32	1	1	39	19	1	75	40	4	10.5	10.5	1	0		
31 TS	1 120	4.	5	C	N	6	2	33	35	35	9.	9.	1	91	40	40	10.5	10.5	2	0		
31 TS	1 124	4.	5	C	N	6	2	23	32	32	5.5	5.5	1	55	30	30	8.	8.5	1	0		
31 TS	1 124	4.	5	C	N	6	2	23	40	40	1.5	2.	1	65	42	42	1.	1.	2	0		
31 TS	1 120	4.	5	C	N	6	2	25	31	31	2.5	3.	1	55	35	35	1.5	2.	1	0		
31 TS	1 123	4.	5	C	N	6	2	20	20	20	0.	.5	1	27	25	25	2.5	2.5	2	0		
31 TS	2 122	4.	5	C	N	6	2	51	1	1	3.	3.	1	55	10	10	2.5	2.5	1	0		
31 TS	2 120	4.	5	C	N	6	2	33	22	22	2.5	2.5	1	52	25	25	1.	1.	1	0		
31 TS	3 120	4.	5	C	N	6	1	12	22	22	3.	3.	1	55	22	22	2.	4.	2	0		
31 TS	3 141	4.	5	C	N	6	1	33	15	15	1.	1.	1	63	40	40	0.	.5	1	0		
31 TS	2 140	4.	5	C	N	6	1	32	22	22	1.	1.5	1	40	32	32	.5	1.	1	0		
31 TS	1 140	4.	5	C	N	6	1	33	35	35	1.	1.	1	35	42	42	1.5	1.5	1	0		
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31 TS	2 141	4.	5	C	N	6	1	31	20	20	2.5	2.5	1	45	25	25	0.	.5	1	0		
31 TS	2 140	4.	5	C	N	6	1	21	15	15	3.5	4.	1	45	15	15	2.5	3.5	1	0		
31 TS	2 140	4.	5	C	N	6	1	50	12	12	3.	7.	1	62	25	25	1.5	2.5	1	0		
31 TS	3 120	4.	5	C	N	6	1	31	15	15	1.5	1.5	1	8	10	10	1.5	1.5	1	0		
31 TS	3 120	4.	5	C	N	6	1	35	12	12	5.5	6.	1	25	15	15	5.	5.	1	0		
31 TS	3 121	4.	5	C	N	6	1	21	20	20	7.	7.	1	35	8	8	4.	4.	1	0		
31 TS	1 121	4.	5	C	N	6	1	21	21	21	2.	2.	1	74	40	40	2.	2.	1	0		
31 TS	1 120	4.	5	C	N	6	1	17			10.	10.	1	65	30	30	6.	10.5	1	0		
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31 TS	1 120	4.	5	C	N	6	1	13	25	25	2.	2.5	1	70	45	45	7.	7.	1	0		
31 TS	1 120	4.	5	C	N	6	1	15	30	30	2.5	2.5	1	70	45	45	1.	1.	1	0		
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31 TS	2 120	4.	5	C	N	6	1	52	15	15	3.5	3.5	1	50	12	12	2.5	2.5	1	0		
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31 TS	2 120	4.	5	C	N	6	1	35	11	11	1.5	2.	1	55	12	12	1.5	1.5	1	0		
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31 PH	3 145	4.	2	7	C	G	8	1	15	23	23	0.	3.	1	21	19	19	1.	4.	1	0	
31 PH	3 145	4.	2	7	C	G	8	1	12	21	20	2.	3.	1	51	20	20	3.	4.	1	0	
31 PH	3 145	4.	2	7	C	G	8	1	32	23	23	5.5	5.5	1	30	25	25	3.5	7.	1	0	
31 TS	3 119	4.	2.5	7	C	N	9	3	15	13	13	5.	5.	1	20	10	10	5.	5.	1	0	
31 TS	3 110	4.	2.5	7	C	N	9	3	12	13	13	3.	3.	1	8	25	25	6.5	6.5	1	0	
31 TS	3 110	4.	2.5	7	C	N	9	3	32	15	15	7.5	7.5	2							1	0
31 TS	1 110	4.	2.5	7	C	N	9	3	18	15	15	0.	0.	1	48	18	18	2.5	2.5	1	0	
31 PH	1 117	4.	2.5	7	C	N	9	3	30	21	20	4.	4.	1	15	22	22	4.	4.	1	0	
31 PH	1 110	4.	2.5	7	C	N	9	3	21	15	15	5.5	5.5	1	40	25	25	3.5	3.5	1	0	
31 PH	1 110	4.	2.5	7	C	N	9	3	20	21	21	5.	5.	1	32	30	30	5.	5.	1	0	
31 TS	1 120	4.	2.5	7	C	N	9	3	21	10	10	5.5	5.5	1	38	15	15	5.5	5.5	1	0	
31 TS	2 110	4.	2.5	7	C	N	9	3	25	21	21	1.	1.	1	38	22	22	1.5	1.5	1	0	
31 TS	2 110	4.	2.5	7	C	N	9	3	22	12	12	2.	2.	1	38	15	15	4.	4.	1	0	
31 TS	2 110	4.	2.5	7	C	N	9	3	36	1	1	5	3.	3.	1	44	5	5	5.	5.	1	0
31 HT	3 123	4.	3	7	C	N	3	3	34	19	19			1	49	37	37				1	0
31 HT	3 123	4.	3	7	C	N	3	3	13	13	13			1	34	15	15				2	0
31 HT	3 123	4.	3	7	C	N	3	3	24	21	20	5.5	5.5	1	50	21	21	1.5	1.5	1	0	
31 HT	1 123	4.	3	7	C	N	3	3	13	20	20	2.	3.	1		38	35	2.5	3.5	2	0	

31	HT	1	123	.3	7	C	N	3	3	1	44	44	0.	3.	1	31	56	56	2.5	3.5	2	C
31	HT	1	123	.3	7	C	N	3	3	13	33	43	3.	3.	1	1	30	30	2.5	4.5	2	C
31	PH	2	165	.2	7	C	G	6	3	12	12	12	15.	15.	1	20	12	12	11.	11.	1	C
31	HT	2	123	.3	7	C	N	3	3	13	33	33	2.	2.	1	25	58	58	0.	0.	1	C
31	HT	2	123	.3	7	C	N	3	3	21	35	36	1.	1.	1	37	38	38	3.	3.	1	C
31	HT	2	123	.3	7	C	N	3	3	23	33	39	0.	0.	1	46	24	23	3.	3.	1	C
31	PH	3	165	.18.	7	C	N	7	3	14	45	48	0.	0.	1	25	20	20	1.	1.	1	0
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31	PH	3	165	.18.	7	C	N	7	3	30	52	62	0.	0.	1	27	20	20	0.	0.	1	0
31	PH	4	165	.13.	7	C	N	5	3	31	52	52	4.5	4.5	1	60	45	45	1.	1.	1	0
31	PH	3	165	.13.	7	C	N	5	3	28	44	44	0.	0.	1	67	54	58	2.5	2.5	1	0
31	HT	3	123	.25.	8	C	N	5	3	12	52	52	1.5	1.5	1	32	50	50	7.	7.	1	0
31	HT	3	123	.25.	8	C	N	5	3	45	54	58	2.5	2.5	1	42	48	48	6.5	7.	1	0
31	HT	4	123	.13.	7	C	N	5	3	30	61	61	1.	1.	1	50	65	65	3.	3.	1	0
31	HT	3	165	.13.	7	C	N	5	3	17	45	40	1.	1.1	1	18	22	22	1.	2.	1	0
31	PH	2	165	.13.	7	C	N	7	3	17	17	17	3.	3.	1	65	20	20	4.5	4.5	1	0
31	PH	1	165	.13.	7	C	N	7	3	47	23	25	0.	0.	1	47	25	20	0.	0.	1	0
31	PH	1	165	.13.	7	C	N	7	3	45	33	33	1.5	1.5	1	47	22	22	1.5	1.5	1	0
31	PH	2	165	.13.	7	C	N	5	3	23	13	18	1.5	2.	1	64	16	16	1.5	3.	1	0
31	PH	2	165	.13.	7	C	N	5	3	15	13	18	2.5	3.	1	63	21	21	3.	5.	1	0
31	PH	1	165	.13.	7	C	N	5	3	24	12	12	1.5	0.	1	22	16	16	2.5	3.	1	0
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31	PH	2	165	.25.	8	C	N	5	3	14	33	35	1.	2.	1	40	45	45	1.	3.5	1	0
31	PH	2	165	.25.	8	C	N	5	3	20	32	35	3.	4.5	1	50	48	40	0.	5.5	1	0
31	PH	2	165	.13.	7	C	N	7	3	7	31	20	2.	2.5	1	32	27	27	1.5	1.5	1	0
31	PH	2	165	.18.	7	C	N	7	3	3	20	21	3.	3.	1	25	29	29	3.	3.	1	0
31	PH	2	165	.13.	7	C	N	7	3	9	12	12	3.	3.	1	38	22	22	4.	4.	1	0
31	TS	2	145	.12.	7	C	N	9	3	13	35	35	5.5	5.5	1	60	33	33	2.	2.	1	0
31	PH	2	145	.12.	7	C	N	9	3	17	31	30	2.5	2.5	1	70	30	30	4.	4.	1	0
31	PH	2	145	.12.	7	C	N	9	3	11	33	38	6.	6.	1	35	43	43	5.	5.	1	0
31	PH	2	145	.12.	7	C	N	9	3	5	32	32	3.5	3.5	1	40	35	35	0.	0.	1	0
31	PH	2	145	.12.	7	C	N	9	3	23	21	20	1.	1.	1	60	50	50	1.	1.	1	0
31	PH	2	145	.12.	7	C	N	9	3	12	35	55	2.5	2.5	1	4.	38	38	2.5	2.5	1	0
31	TS	1	145	.12.	7	C	N	9	3	12	31	30	5.	5.	1	66	33	33	2.5	2.5	1	0
31	TS	1	145	.12.	7	C	N	9	3	12	25	25	4.5	4.5	1	60	32	32	3.5	3.5	1	0
31	PH	1	145	.12.	7	C	N	9	3	10	10	30	4.5	4.5	1	72	13	13	2.	2.	1	0
31	PH	1	145	.12.	7	C	N	9	3	12	20	20	5.	5.	1	66	34	34	2.5	2.5	1	0
31	PH	1	145	.12.	7	C	N	9	3	11	33	33	7.5	7.5	1	25	57	57	9.	9.	1	0
31	PH	1	145	.12.	7	C	N	9	3	10	20	27	10.5	10.5	1	48	42	42	12.	12.	1	0
31	HT	2	160	.13.	7	C	N	5	3	40	130	130	2.5	2.5	2							0
31	PH	2	145	.7.5	7	C	G	A	2	35	21	21	0.	1.	1	25	33	33	0.	1.	1	C
31	PH	2	145	.7.5	7	C	G	A	2	41	34	34	0.	1.	1	50	42	42	0.	2.	1	C
31	PH	2	145	.7.5	7	C	G	A	2	33	33	39	0.	3.5	1	41	35	35	5.5	6.	1	C
31	PH	2	145	.7.5	7	C	G	A	2	64	42	42	3.5	4.	1	51	42	42	3.5	4.	1	C
31	TS	3	110	.2.5	7	C	N	9	2	23	10	10	8.	8.	1	20	15	15	6.	6.	1	0
31	TS	3	110	.2.5	7	C	N	9	2	32	15	15	8.	8.	1	30	30	30	5.	5.	1	0
31	PH	3	110	.2.5	7	C	N	9	2	63	37	37	4.5	4.5	1	18	17	17	4.	4.	1	0
31	PH	3	111	.2.5	7	C	N	9	2	33	34	38	1.	1.	1	15	10	10	6.	6.	1	0
31	TS	1	110	.2.5	7	C	N	9	2	12	12	12	5.	5.	1	32	10	10	2.5	2.5	1	0
31	TS	1	110	.2.5	7	C	N	9	2	17	13	13	2.5	2.5	1	35	17	17	2.	2.	1	0
31	PH	1	110	.2.5	7	C	N	9	2	7	11	11	2.	2.	1	17	15	15	2.	2.5	1	0
31	PH	1	110	.2.5	7	C	N	9	2	22	15	15	4.	4.	1	40	43	43	3.5	3.5	1	0
31	PH	1	110	.2.5	7	C	N	9	2	24	20	20	2.5	2.5	1	40	22	22	1.	1.	1	0
31	PH	2	111	.2.5	7	C	N	9	2	20	13	13	5.	10.	1	13	13	13	10.	10.	1	0
31	PH	2	111	.2.5	7	C	N	9	2	15	15	15	0.5	0.5	1	11	14	14	7.5	7.5	1	0
31	PH	2	110	.2.5	7	C	N	9	2	25	15	15	5.	5.	1	12	13	13	5.5	5.5	1	0
31	TS	2	112	.2.5	7	C	N	9	2	18	17	17	2.	2.	1	48	20	20	0.	0.	1	0

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31 TS 2 110	2.5	7	C	N	9	2	23	17	17	0.	0.	1	54	16	15	2.5	2.5	1	0
31 TS 2 110	2.5	7	C	N	9	2	23	18	18	2.	2.	1	42	17	17	0.	0.	1	0
31 PH 3 145	2.7	C	G	A	2	30	24	24	24	0.	0.	1	18	31	31	5.	5.	2	C
31 PH 3 145	2.7	C	G	A	2	24	29	29	29	0.	0.	1	42	30	30	3.	3.	1	C
31 PH 3 145	2.7	C	G	A	2	27	17	17	17	6.	9	1	34	19	19	4.5	5.	2	C
31 HT 4 123	3.7	C	N	3	2	23	23	23	23	0.	0.	1	31	35	35	0.	0.	1	C
31 HT 4 123	3.7	C	N	3	2	25	14	14	14	0.	0.	1	15	42	42	0.	0.	1	C
31 HT 4 123	3.7	C	N	3	2	23	14	14	14	0.	0.	1	35	31	31	3.	3.	1	C
31 PH 1 145	2.7	C	G	A	2	31	30	30	30	2.5	4.5	1	38	20	20	4.	5.5	1	C
31 PH 2 145	2.7	C	G	A	2	23	21	21	21	5.5	8.5	1	39	20	20	6.	7.5	1	C
31 PH 2 145	2.7	C	G	A	2	21	24	24	24	4.5	6.	2							
31 PH 2 145	2.7	C	G	A	2	35	34	34	34	7.5	11	2							
31 PH 2 145	2.7	C	G	A	2	20	43	44	44	0.	0.	2							C
31 PH 2 145	2.7	C	G	A	2	31	31	30	30	0.	0.	2	38	20	20	4.	7.	2	C
31 HT 1 123	3.7	C	N	3	2	4	40	40	40	0.	0.	1	20	39	39	3.	4.5	2	C
31 HT 1 123	3.7	C	N	3	2	11	11	11	11	3.5	3.5	1	50	40	40	2.	2.5	1	C
31 HT 1 123	3.7	C	N	3	2	35	31	31	31	1.	2.	1	50	33	33	2.5	3.5	1	C
31 PH 2 145	2.7	C	G	A	2	11	12	12	12	0.	0.	1	20	14	14	3.	7.	1	C
31 PH 2 145	2.7	C	G	A	2	9	10	10	10	10.	10.	1	35	13	13	6.	7.5	1	C
31 PH 2 145	2.7	C	G	A	2	9	12	12	12	10.	10.	1	20	14	14	8.	9.5	1	C
31 HT 2 123	3.7	C	N	3	2	23	24	24	24	1.5	1.5	1	38	30	30	0.	0.	1	C
31 HT 2 123	3.7	C	N	3	2	30	20	20	20	0.	0.	1	38	24	24	0.	0.	1	C
31 HT 2 123	3.7	C	N	3	2	24	28	28	28	1.	1.	1	43	30	30	3.	0.	1	C
31 PH 3 145	25.	4	C	N	5	2	35	64	64	1.	1.	1	50	60	60	2.	2.	1	0
31 PH 3 145	25.	4	C	N	5	2	30	64	64	2.5	2.5	1	40	55	55	1.5	1.5	1	0
31 PH 3 145	25.	4	C	N	5	2	13	52	52	1.	3.5	1	30	52	52	2.5	3.	1	0
31 PH 3 145	12.	7	C	N	9	2	40	55	55	1.	1.	1	38	40	40	0.	0.	1	0
31 PH 3 145	12.	7	C	N	9	2	33	44	44	2.	2.	1	40	33	33	1.	1.	1	0
31 PH 3 145	13.	7	C	N	7	2	58	90	90	0.	0.	1	33	20	20	0.	0.	1	0
31 PH 3 145	13.	7	C	N	7	2	60	75	75	0.	0.	1	30	13	13	0.	0.	1	0
31 PH 3 145	13.	7	C	N	7	2	58	78	78	0.	0.	1	25	10	10	1.	1.	1	0
31 PH 3 145	13.	7	C	N	5	2	13	41	41	0.	1.5	1	52	40	40	1.5	1.5	1	0
31 PH 3 145	13.	7	C	N	5	2	10	20	20	0.	0.	1	51	42	42	2.5	3.	1	0
31 PH 3 145	13.	7	C	N	5	2	32	25	25	1.5	2.5	1	02	42	42	0.	0.	1	0
31 PH 2 145	25.	4	C	N	5	2	20	60	60	7.	7.	1	35	62	62	7.5	7.5	1	0
31 PH 2 145	25.	4	C	N	5	2	15	20	20	7.	7.	1	40	60	60	7.	7.	1	0
31 PH 2 145	25.	4	C	N	5	2	14	55	55	5.	5.	1	25	56	56	6.	6.5	1	0
31 PH 2 145	25.	4	C	N	5	2	32	40	40	6.	6.	1	42	48	48	7.	7.	1	0
31 PH 2 145	25.	4	C	N	5	2	15	40	40	5.	6.5	1	30	40	40	5.	6.5	1	0
31 PH 2 145	25.	4	C	N	5	2	10	40	40	5.	8.5	1	30	42	42	5.5	7.	1	0
31 PH 2 145	18.	7	C	N	7	2	7	28	28	2.	2.	1	32	27	27	1.5	1.5	1	0
31 PH 2 145	18.	7	C	N	7	2	7	15	15	2.5	2.5	1	34	18	18	2.	2.	1	0
31 HT 3 145	25.	4	C	N	5	2	40	55	55	3.5	4.5	1	30	42	42	3.	5.5	1	0
31 HT 3 145	25.	4	C	N	5	2	60	50	50	4.	4.5	1	42	40	40	3.5	4.	1	0
31 HT 3 145	13.	7	C	N	5	2	38	73	78	2.5	4.	1	75	55	55	0.	2.	1	0
31 HT 3 145	13.	7	C	N	5	2	40	71	70	2.	5.5	1	76	66	66	3.	3.	1	0
31 HT 3 145	13.	7	C	N	5	2	10	50	50	2.5	6.	1	50	48	48	3.5	3.5	1	0
31 PH 1 145	14.	7	C	N	7	2	55	48	48	5.	5.	1	48	30	30	3.5	3.5	1	0
31 PH 1 145	14.	7	C	N	7	2	25	35	35	4.5	4.5	1	40	25	25	2.5	2.5	1	0
31 PH 1 145	13.	7	C	N	7	2	20	32	32	2.	2.	1	38	25	25	3.	3.	1	0
31 PH 2 145	13.	7	C	N	5	2	18	22	22	1.5	3.	1	60	22	22	2.5	4.5	1	0
31 PH 2 145	13.	7	C	N	5	2	18	22	22	2.	2.	1	62	28	28	2.	3.	1	0
31 PH 2 145	13.	7	C	N	7	2	7	17	17	0.	0.	1	30	20	20	2.5	2.5	1	0
31 PH 2 145	12.	7	C	N	9	2	12	26	20	1.	1.	1	51	38	38	0.	0.	1	0
31 PH 2 145	12.	7	C	N	9	2	33	13	18	1.5	1.5	1	60	34	34	1.	1.	1	0
31 PH 2 145	12.	7	C	N	9	2	12	13	13	2.	2.	1	57	32	32	0.	0.	1	0
31 PH 2 145	12.	7	C	N	9	2	4	13	32	2.5	2.5	1	33	31	30	2.	2.	1	0
31 PH 2 145	12.	7	C	N	9	2	12	23	23	2.5	2.5	1	42	27	25	1.	1.	1	0

31 PH 2 145 12. 7 C N 9 2 12 24 24 1. 1. 1 46 46 46 2.5 2.5 1 0
31 TS 1 145 12. 7 C N 9 2 12 22 22 5. 5. 1 54 31 31 3. 3. 1 0
31 TS 1 145 12. 7 C N 9 2 13 33 33 5. 5. 1 56 30 30 1.5 1.5 1 0
31 TS 1 145 12. 7 C N 9 2 14 33 33 1.5 1.5 1 56 33 33 2.5 2.5 1 0
31 PH 1 145 12. 7 C N 9 2 21 23 23 5. 5. 1 63 34 34 5. 5. 1 0
31 PH 1 145 12. 7 C N 9 2 21 12 12 3. 3. 1 62 24 24 5. 5. 1 0
31 PH 1 145 12. 7 C N 9 2 12 20 20 5. 5. 1 50 23 23 7.5 7.5 1 0
31 HT 2 145 13. 7 C N 9 2 51 51 61 6. 7. 1 75 45 45 5.5 6.5 1 0
31 HT 2 145 13. 7 C N 9 2 71 131 131 3. 3. 1 55 60 60 5.5 6.5 1 0
31 HT 2 145 13. 7 C N 9 2 52 111 111 1. 2. 1 75 78 78 1.5 1.5 2 0
31 HT 2 145 13. 7 C N 9 2 74 141 141 2. 2. 1 80 112 112 1.2 1.2 1 0
31 TS 2 111 2.5 7 C N 9 1 11 20 20 7. 7. 1 15 15 15 6.5 6.5 1 0
31 TS 2 111 2.5 7 C N 9 1 22 15 15 4. 4. 1 17 20 20 6.5 6.5 1 0
31 TS 2 111 2.5 7 C N 9 1 28 15 15 5. 5. 1 22 18 18 7.5 7.5 1 0
31 PH 3 111 2.5 7 C N 9 1 34 34 38 8. 8. 1 11 20 20 7.5 7.5 1 0
31 PH 3 110 2.5 7 C N 9 1 43 20 20 5. 5. 2 0 0
31 PH 1 145 7.5 7 C G 8 1 15 33 25 4. 4. 1 48 48 50 2.5 4. 1 0
31 PH 1 145 7.5 7 C G 8 1 34 61 61 4.5 4.5 1 55 63 63 3.5 4.5 1 0
31 TS 1 110 2.5 7 C N 9 1 12 12 12 5. 5. 1 37 18 18 2.5 2.5 1 0
31 PH 1 110 2.5 7 C N 9 1 12 10 10 3. 3. 1 42 20 20 2. 2. 1 0
31 PH 1 110 2.5 7 C N 9 1 12 11 11 3. 3. 1 42 18 18 1. 1. 1 0
31 PH 2 110 2.5 7 C N 9 1 21 11 11 3.5 3.5 1 13 17 17 5.5 5.5 1 0
31 PH 2 145 7.5 7 C G 8 1 45 43 43 2.5 2.5 2 0
31 PH 2 145 7.5 7 C G 8 1 35 18 18 4. 4. 2 0 0
31 PH 2 145 7.5 7 C G 8 1 48 33 33 1. 1. 2 0 0
31 PH 2 145 7.5 7 C G 8 1 40 41 41 1. 1. 1 41 44 44 1.5 2.5 1 0
31 PH 2 145 7.5 7 C G 8 1 23 42 42 1. 1. 1 60 54 54 0. 1. 1 0
31 PH 2 145 7.5 7 C G 8 1 30 51 51 0. 1. 2 0 0
31 PH 2 145 7.5 7 C G 8 1 33 9 9 6. 6. 2 0 0
31 PH 2 145 7.5 7 C G 8 1 31 31 30 1. 3. 2 0 0
31 TS 2 111 2.5 7 C N 9 1 4 13 13 5. 5. 1 50 20 20 1.5 1.5 1 0
31 TS 2 110 2.5 7 C N 9 1 31 22 22 5. 5. 1 32 18 18 0. 1. 1 0
31 TS 2 110 2.5 7 C N 9 1 36 13 13 3. 3. 1 33 24 24 1.5 1.5 1 0
31 PH 2 120 7.5 7 C G 8 1 43 33 33 4. 5. 2 0 0
31 PH 2 145 2. 7 C G 8 1 21 21 24 4. 4. 1 61 33 33 2.5 4. 1 0
31 PH 3 145 2. 7 C G 8 1 31 31 30 2. 1. 1 41 36 36 3. 5. 1 0
31 PH 3 145 2. 7 C G 8 1 29 31 31 3. 3. 1 42 53 53 2.5 5.5 1 0
31 PH 3 145 2. 7 C G 8 1 29 37 37 3.5 5. 1 48 53 53 3. 5.5 1 0
31 PH 3 145 2. 7 C G 8 1 66 43 43 3. 5.5 1 0
31 HT 3 123 3. 7 C N 3 1 14 12 12 1 43 25 25 1 0
31 HT 3 123 3. 7 C N 3 1 22 11 10 1 24 10 44 1 0
31 HT 3 123 3. 7 C N 3 1 22 25 25 1 48 28 28 1 0
31 PH 4 145 2. 7 C G 8 1 31 46 46 2. 3. 1 29 31 31 2.5 4.5 1 0
31 PH 4 145 2. 7 C G 8 1 25 54 64 5. 5. 1 51 52 52 5. 5. 1 0
31 PH 4 145 2. 7 C G 8 1 47 31 31 6. 6. 1 53 47 47 2.5 4. 1 0
31 PH 4 145 2. 7 C G 8 1 34 58 58 6.5 8. 1 42 56 56 5. 5. 1 0
31 PH 4 145 2. 7 C G 8 1 22 21 21 1. 3. 1 24 16 16 2.5 2.5 1 0
31 PH 4 145 2. 7 C G 8 1 43 40 46 1. 2. 1 44 28 28 5. 7. 1 0
31 PH 4 145 2. 7 C G 8 1 31 31 32 5. 6. 1 32 39 39 3.5 3.5 1 0
31 PH 4 145 2. 7 C G 8 1 51 43 43 3.5 4. 1 40 47 47 4.5 4.5 1 0
31 PH 4 145 2. 7 C G 8 1 36 53 53 2.5 5.5 1 31 42 42 6.5 6.5 1 0
31 PH 4 145 2. 7 C G 8 1 38 24 26 1.5 4. 1 40 24 24 2.5 4. 1 0
31 PH 4 145 2. 7 C G 8 1 23 27 27 1. 2. 1 38 23 23 1. 2. 1 0
31 PH 4 145 2. 7 C G 8 1 25 28 28 1. 5. 1 41 24 24 3. 4. 1 0
31 PH 4 145 2. 7 C G 8 1 15 23 23 2. 2. 1 45 37 37 6. 1. 1 0
31 PH 4 145 2. 7 C G 8 1 47 51 51 1.5 1.5 1 58 48 48 0. 1. 1 0
31 PH 4 145 2. 7 C G 8 1 21 37 37 2. 2. 1 47 24 24 5. 2. 1 0

31 PH 1 145	.2	7	C	G	A	1	10	27	27	2.5	0	1	33	18	18	3.	4.5	1	C
31 PH 1 145	.2	7	C	G	B	1	17	23	26	2.	0	1	38	17	17	4.5	6.	1	C
31 PH 2 145	.2	7	C	G	B	1	41	30	33	2.	0	2							C
31 PH 2 145	.2	7	C	G	B	1	25	31	39	13.	11.	2							C
31 PH 2 145	.2	7	C	G	A	1	30	21	21	10.	11.	2							C
31 PH 2 145	.2	7	C	G	B	1	21	11	15	5.	2.	2							C
31 PH 2 145	.2	7	C	G	B	1	37	29	29	3.	1.	1	29	16	16	6.5	6.5	1	C
31 PH 2 145	.2	7	C	G	B	1	26	29	29	2.	0.	2							C
31 HT 1 123	.3	7	C	N	A	1	31	31	31	0.	2.5	1	53	20	20	1.5	2.5	1	C
31 HT 1 123	.3	7	C	N	A	1	19	21	29	1.5	3.	1	60	29	29	5.5	5.5	1	C
31 HT 1 123	.3	7	C	N	A	1	24	23	29	1.	3.	1	60	31	31	2.5	3.5	1	C
31 PH 2 145	.2	7	C	G	A	1	23	33	33	2.	2.5	1	34	24	23	1.	1.	1	C
31 PH 2 145	.2	7	C	G	B	1	13	23	23	1.	1.	1	43	28	29	1.	2.5	1	C
31 PH 2 145	.2	7	C	G	B	1	22	27	27	3.	3.	1	54	34	34	1.	1.	1	C
31 PH 2 145	.2	7	C	G	A	1	33	21	24	1.5	2.	1	54	30	30	0.	1.	1	C
31 PH 2 145	.2	7	C	G	A	1	17	21	21	2.	2.	1	54	26	26	1.	3.	1	C
31 PH 2 145	.2	7	C	G	A	1	10	12	12	3.5	6	1	29	17	15	4.	4.5	1	C
31 PH 2 145	.2	7	C	G	A	1	11	9	9	3.5	3.5	1	23	16	16	1.5	1.5	1	C
31 PH 2 145	.2	7	C	G	A	1	4	11	13	2.5	3	1	22	14	14	.5	1.	1	C
31 PH 2 145	10.	7	C	N	A	1	73	71	71	2.5	2.5	2							0
31 PH 3 145	18.	7	C	N	A	1	81	38	113	7.5	7.5	2							0
31 PH 3 145	12.	7	C	N	A	1	10	51	51	1.	0.	1	27	32	32	4.	4.	1	0
31 PH 3 145	12.	7	C	N	A	1	30	52	52	3.	3.	1	34	40	40	1.5	1.5	1	0
31 PH 3 145	12.	7	C	N	A	1	15	51	51	1.5	1.5	1	35	38	38	2.5	2.5	1	0
31 PH 3 145	12.	7	C	N	A	1	30	33	33	1.	1.	1	40	38	38	1.5	1.5	1	0
31 PH 3 145	13.	7	C	N	A	1	50	43	98	5.5	5.5	1	28	39	39	6.5	6.5	1	0
31 PH 3 145	16.	7	C	N	A	1	74	43	103	1.5	1.5	1	27	20	20	.5	.5	1	0
31 PH 3 145	13.	7	C	N	A	1	37	51	51	3.	3.	1	51	42	42	2.	2.	1	0
31 PH 3 145	13.	7	C	N	A	1	28	43	43	3.5	4.	1	50	48	48	2.	2.5	1	0
31 PH 3 145	13.	7	C	N	A	1	12	28	28	4.	4.	1	61	44	44	2.5	3.	1	0
31 PH 3 145	25.	4	C	N	A	1	42	59	59	1.	3.	1	36	50	50	1.	1.5	1	0
31 PH 3 145	25.	4	C	N	A	1	42	55	55	1.	2.5	1	41	59	5	1.	1.5	1	0
31 PH 3 145	13.	7	C	N	A	1	26	12	12	2.5	5.5	1	72	22	22	5.	5.5	1	0
31 PH 3 145	13.	7	C	N	A	1	74	22	22	0.	0.	1	58	28	28	3.	3.5	1	0
31 PH 3 145	25.	4	C	N	A	1	29	52	52	3.	4.5	1	59	56	56	3.5	4.5	1	0
31 PH 3 145	25.	4	C	N	A	1	14	51	51	2.5	3.5	1	42	56	56	5.	5.	1	0
31 PH 3 145	25.	4	C	N	A	1	24	40	40	4.	4.5	1	30	42	42	4.0	4.5	1	0
31 PH 3 145	25.	4	C	N	A	1	32	51	51	7.	7.5	1	18	24	59	7.5	7.5	1	0
31 PH 2 145	18.	7	C	N	A	1	7	28	28	1.	1.	1	32	35	35	0.	0.	1	0
31 PH 2 145	13.	7	C	N	A	1	5	35	35	1.	1.	1	28	35	35	1.	1.	1	0
31 PH 2 145	18.	7	C	N	A	1	5	27	27	4.	4.	1	37	30	30	2.5	2.5	1	0
31 HT 3 145	25.	4	C	N	A	1	32	42	42	2.5	4.	1	55	48	48	7.5	7.5	1	0
31 HT 3 145	25.	4	C	N	A	1	20	39	38	0.	3.	1	31	32	32	3.	5.	1	0
31 HT 3 145	13.	7	C	N	A	1	52	38	88	2.5	2.5	1	75	65	65	.5	3.	1	0
31 PH 1 145	19.	7	C	N	A	1	17	30	30	0.	0.	1	39	30	30	0.	0.	1	0
31 PH 1 145	19.	7	C	N	A	1	27	29	29	2.	2.	1	43	28	28	1.	1.	1	0
31 PH 1 145	18.	7	C	N	A	1	53	45	45	3.5	3.5	1	49	28	28	1.	1.	1	0
31 TS 2 145	12.	7	C	N	A	1	33	23	24	1.	1.	1	50	35	35	.5	.5	1	0
31 TS 2 145	12.	7	C	N	A	1	22	21	21	5.	5.	1	56	24	23	5.	5.	1	0
31 TS 2 145	12.	7	C	N	A	1	33	22	22	2.5	2.5	1	57	38	39	0.	0.	1	0
31 PH 2 145	12.	7	C	N	A	1	10	27	27	3.	3.	1	46	26	26	2.	2.	1	0
31 PH 2 145	12.	7	C	N	A	1	4	16	24	1.5	1.5	1	39	24	24	1.5	1.5	1	0
31 TS 1 110	2.5	7	C	N	A	1	31	19	19	2.	2.	1	45	19	19	3.	3.	1	0
31 TS 1 145	12.	7	C	N	A	1	23	21	20	2.5	2.5	1	54	19	47	4.	4.	1	0
31 TS 1 145	12.	7	C	N	A	1	20	37	37	3.5	3.5	1	48	40	40	4.	4.	1	0
31 TS 1 145	12.	7	C	N	A	1	33	33	33	2.5	2.5	1	63	37	37	2.5	2.5	1	0
31 PH 1 110	2.5	7	C	N	A	1	19	19	19	2.	2.	1	30	19	19	1.	1.	1	0
31 PH 1 145	12.	7	C	N	A	1	23	33	33	2.	2.	1	57	25	24	2.5	2.5	1	0



31	PH	1	145	12.	7	C	N	9	1	20	20	20	1.5	1.5	1	75	27	27	3.5	3.5	1	0
31	PH	1	145	12.	7	C	N	9	1	14	21	21	5.	5.	1	75	24	24	4.4	4.4	1	0
31	HT	2	160	13.	7	C	N	5	1	51	39	99	3.1	3.1	1	75	80	80	3.	3.	1	0
31	HT	2	160	13.	7	C	N	5	1	63	111	118	2.	2.	1	75	61	61	1.	1.	1	0
31	HT	2	160	13.	7	C	N	5	1	47	77	97	5.	5.	1	75	68	68	5.	5.	1	0
31	HT	2	160	13.	7	C	N	5	1	63	73	70	1.	1.	1	75	53	53	2.5	2.5	1	0
31	HT	2	160	13.	7	C	N	5	1	52	72	72	2.5	2.5	1	75	42	42	3.	3.	1	0
31	HT	2	170	5.5	2	C	N	2	1	24	12	66	10.5	10.5	1	75	64	64	7.5	7.5	1	0
31	HT	2	170	5.5	2	C	N	2	1	43	57	57	9.5	9.5	1	75	57	57	9.5	9.5	1	0
31	HT	2	170	5.5	2	C	N	2	2	15	35	64	9.5	9.5	1	75	26	26	4.	4.	1	0
31	HT	2	170	5.5	2	C	N	2	2	17	51	61	5.5	5.5	1	75	11	11	14.5	14.5	1	0
31	HT	2	170	5.5	2	C	N	2	2	45	53	58	8.0	8.0	1	75	57	57	10.5	10.5	1	0
31	HT	2	170	5.5	2	C	N	2	2	36	32	32	5.5	5.5	1	75	48	48	4.5	4.5	1	0
31	HT	2	170	5.5	2	C	N	2	2	26	37	37	5.1	5.1	1	75	52	52	5.5	5.5	1	0
31	HT	2	170	5.5	2	C	N	2	1	31	53	53	7.5	7.5	1	75	47	47	6.0	6.0	1	0
31	HT	2	170	5.5	2	C	N	2	1	10	51	51	8.5	8.5	1	75	22	22	9.5	9.5	1	0
31	TS	1	170	5.5	2	C	N	2	2	22	51	51	8.5	8.5	1	75	53	53	9.0	9.0	1	0
31	TS	1	170	5.5	2	C	N	2	1	11	49	49	3.5	3.5	1	75	51	51	6.5	6.5	1	0
31	TS	1	170	5.5	2	C	N	2	3	25	53	53	6.5	6.5	1	75	55	55	7.0	7.0	1	0
31	TS	1	170	5.5	2	C	N	2	1	35	33	33	4.5	4.5	1	75	20	20	2.5	2.5	1	0
31	TS	1	170	5.5	2	C	N	2	1	30	43	43	3.5	3.5	1	75	40	40	0.5	0.5	1	0
31	TS	2	170	5.5	2	C	N	2	1	33	43	43	2.0	2.0	1	75	28	28	0.5	0.5	1	0
31	TS	2	170	5.5	2	C	N	2	1	25	43	43	9.0	9.0	1	75	50	50	7.0	7.0	1	0
31	TS	2	170	5.5	2	C	N	2	1	27	47	49	7.0	7.0	1	75	53	53	6.0	6.0	1	0
31	TS	2	170	5.5	2	C	N	2	1	25	45	45	2.5	2.5	1	75	53	53	4.5	4.5	1	0
31	TS	2	170	5.5	2	C	N	2	1	23	45	45	4.1	4.1	1	75	47	47	5.5	5.5	1	0
31	TS	2	170	5.5	2	C	N	2	1	23	41	40	5.0	5.0	1	75	41	41	0.0	0.0	1	0
31	TS	2	170	5.5	2	C	N	2	1	23	44	44	0.0	0.0	1	75	43	43	5.0	5.0	1	0
31	TS	2	170	5.5	2	C	N	2	1	33	49	49	3.0	3.0	1	75	45	45	6.5	6.5	1	0
31	TS	2	170	5.5	2	C	N	2	1	21	55	55	3.0	3.0	1	75	47	47	0.1	0.1	1	0
31	TS	2	170	5.5	2	C	N	2	1	20	51	50	4.0	4.0	1	75	47	47	2.5	2.5	1	0
31	TS	2	170	5.5	2	C	N	2	1	27	46	45	3.1	3.1	1	75	49	49	2.5	2.5	1	0
31	TS	2	170	5.5	2	C	N	2	1	34	40	40	5.0	5.0	1	75	71	71	4.0	4.0	1	0
31	TS	2	170	5.5	2	C	N	2	1	25	45	45	9.5	9.5	1	75	42	42	7.5	7.5	1	0
31	TS	2	170	5.5	2	C	N	2	1	43	42	42	9.0	9.0	1	75	47	47	8.5	8.5	1	0
31	TS	2	170	5.5	2	C	N	2	1	45	50	50	7.5	7.5	1	75	41	41	4.5	4.5	1	0
31	TS	2	170	5.5	2	C	N	2	1	24	40	40	4.5	4.5	1	75	40	40	5.0	5.0	1	0
31	TS	2	170	5.5	2	C	N	2	1	37	41	41	9.1	9.1	1	75	37	37	6.0	6.0	1	0
31	TS	2	170	5.5	2	C	N	2	1	25	35	36	7.5	7.5	1	75	36	36	3.0	3.0	1	0
31	TS	2	170	5.5	2	C	N	2	1	50	43	43	2.1	2.1	1	75	39	39	2.5	2.5	1	0
31	TS	3	150	2.5	6	C	N	2	1	22			6.	6.	1	75			2.5	2.5	1	0
31	TS	3	150	2.5	6	C	N	2	1	15			0.	0.	1	75			2.5	2.5	1	0
31	TS	3	150	2.5	6	C	N	2	1	17			8.5	8.5	1	75			7.5	7.5	1	0
31	TS	3	150	2.5	6	C	N	2	1	14			7.5	7.5	1	75			5.5	5.5	1	0
31	TS	3	150	2.5	6	C	N	2	2	17			2.	2.	1	75			1.5	1.5	1	0
31	TS	3	150	2.5	6	C	N	2	2	14			2.5	2.5	1	75			3.5	3.5	1	0
31	TS	3	150	2.5	6	C	N	2	2	16			2.5	2.5	1	75			1.5	1.5	1	0
31	TS	3	150	2.5	6	C	N	2	2	35			5.	5.	1	75			0.	0.	1	0
31	TS	2	170	3.	2	C	N	2	1	21	24	24	9.	9.	1	75	18	18	5.0	5.0	1	0
31	TS	2	170	3.	2	C	N	2	1	21	35	35	4.	4.	1	75	28	28	4.0	4.0	1	0
31	TS	2	170	3.	2	C	N	2	1	14	28	28	2.5	2.5	1	75	27	27	5.0	5.0	1	0
31	TS	2	170	3.	2	C	N	2	1	31	31	31	3.7	3.7	1	75	37	37	6.	6.	1	0
31	TS	2	170	3.	2	C	N	2	2	14	31	31	5.0	5.0	1	75	14	14	6.	6.	1	0
31	TS	2	170	3.	2	C	N	2	2	25	38	38	7.	7.	1	75	20	20	8.	8.	1	0
31	TS	2	170	3.	2	C	N	2	2	12	32	32	6.1	6.1	1	75	28	28	9.	9.	1	0
31	TS	2	170	3.	2	C	N	2	2	22	24	24	7.	7.	1	75	43	43	6.5	6.5	1	0
31	TS	2	170	3.	2	C	N	2	3	20			5.	5.	1	75			1.	1.	1	0
31	TS	2	170	3.	2	C	N	2	3	31			1.5	1.5	1	75			2.	2.	1	0

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43 TS 2 170 3. 2 C N 2 3 24	4.5	6.0	1	18						5.5	5.5	1 0
43 TS 3 170 3. 2 C N 2 1 17	21	21	21	1.0	1.0	1	18	25	25	1.0	3.0	1 0
43 TS 3 170 3. 2 C N 2 1 25	21	21	21	1.0	3.0	1	18	28	28	2.5	2.5	1 0
43 TS 3 170 3. 2 C N 2 1 41				1.5	3.0	1	21			.5	.5	1 0
43 TS 3 170 3. 2 C N 2 2 31				1.0	3.0	1	22			.5	3.0	1 0
43 TS 3 170 3. 2 C N 2 2 25				1.0	2.0	1	26			1.0	4.0	1 0
43 TS 3 170 3. 2 C N 2 2 23				1.0	1.5	1	28			.5	1.5	1 0
43 TS 1 170 3. 2 C N 2 1 23				0.5	6.5	1	17			3.0	6.0	1 0
43 TS 1 170 3. 2 C N 2 1 34				5.5	5.5	1	20			3.5	3.5	1 0
43 TS 1 170 3. 2 C N 2 1 25				4.0	4.0	1	28			0.5	.5	1 0
43 TS 1 170 3. 2 C N 2 2 26				.5	2.0	1	28			.5	.5	1 0
43 TS 1 171 3. 2 C N 2 2 17				2.0	3.0	1	31			1.0	2.0	1 0
43 TS 1 171 3. 2 C N 2 3 16				1.0	4.0	1	18			0.5	4.0	1 0
43 TS 2 170 5.5 2 C N 2 1 13	13	53	11.0	11.0	1	18	45	45	10.0	10.0	1 0	
43 TS 2 170 5.5 2 C N 2 1 19	61	61	10.0	11.0	1	28	56	56	10.0	10.0	1 0	
43 TS 2 170 5.5 2 C N 2 2 16	51	51	1.5	6.0	1	33	46	46	3.5	4.0	1 0	
43 TS 2 170 5.5 2 C N 2 2 17	54	58	1.0	4.0	1	41	44	44	4.0	4.0	1 0	
43 TS 2 170 5.5 2 C N 2 2 25	51	51	1.0	5.0	1	50	46	46	3.0	3.0	1 0	
43 TS 2 171 5.5 2 C N 2 2 11	44	48	15.0	11.0	1	24	72	72	7.0	9.0	1 0	
43 TS 2 170 5.5 2 C N 2 3 13	44	46	2.0	4.0	1	17	46	46	3.5	4.5	1 0	
43 TS 2 170 5.5 2 C N 2 3 21	54	54	1.5	2.0	1	38	41	41	3.0	6.5	2 0	
43 TS 2 170 5.5 2 C N 2 3 13	44	44	13.0	14.0	1	30	37	37	4.0	5.0	1 0	
43 TS 3 170 5.5 2 C G 2 1 71	49	49	1.0	6.0	1	23	48	48	1.5	2.5	1 0	
43 TS 3 170 5.5 2 C G 2 1 33	43	43	2.0	7.5	1	33	39	39	2.0	7.5	1 0	
43 TS 3 170 5.5 2 C G 2 1 75	39	39	5.0	5.0	1	41	40	40	2.0	6.0	1 0	
43 TS 3 170 5.5 2 C G 2 2 36	41	43	4.0	5.5	1	39	41	41	3.0	4.5	1 0	
43 TS 3 170 5.5 2 C G 2 2 29	33	33	1.0	4.0	1	38	33	33	2.5	3.0	1 0	
43 TS 3 170 5.5 2 C G 2 3 65	34	71	7.0	7.0	2						0	
43 TS 1 145 13. 1 C G 2 2 22	27	27	2.0	3.0	1	54	29	29	.5	1.5	1 0	
43 TS 1 145 13. 1 C G 2 2 24	13	13	2.0	2.0	1	57	44	44	2.5	2.5	1 0	
43 TS 1 145 13. 1 C G 2 3 16	25	26	1.5	1.5	1	52	32	32	2.0	2.0	1 0	
43 TS 1 145 13. 1 C G 2 3 20	24	28	4.0	4.0	1	55	35	36	2.5	5.0	1 0	
43 TS 1 145 13. 1 C G 2 3 27	36	36	5.0	7.0	1	46	44	44	5.0	9.0	1 0	
43 TS 1 145 13. 1 C G 2 1 23	30	30	1.5	1.5	1	41	32	32	4.0	2.5	1 0	
43 TS 1 145 13. 1 C G 2 1 26	43	43	2.5	2.5	1	48	48	48	.5	4.0	1 0	
43 TS 1 145 13. 1 C G 2 1 33	43	43	2.0	3.0	1	54	51	51	1.5	4.0	1 0	
43 TS 1 145 13. 1 C G 2 2 10	33	33	3.0	3.0	1	28	60	60	0.5	7.5	1 0	
43 TS 1 145 13. 1 C G 2 2 15	35	35	0.5	1.0	1	41	49	49	1.5	2.5	1 0	
43 TS 1 145 13. 1 C G 2 3 51	49	49	0.5	1.0	1	42	54	54	1.0	2.5	1 0	
43 TS 1 145 13. 1 C G 2 3 24	34	34	4.5	1.0	1	70	47	47	1.5	1.5	1 0	
43 TS 1 145 13. 1 C G 2 3 26	43	46	1.0	1.5	1	67	40	40	1.5	1.5	1 0	
43 TS 3 145 13. 1 C G 2 1 17	32	32	2.5	5.0	1	26	44	44	1.5	2.5	1 0	
43 TS 1 150 2.5 6 C N 2 1 13	25	26	0.0	0.5	1	40	25	25	0.0	0.0	1 0	
43 TS 1 150 2.5 6 C N 2 1 21	31	31	3.5	3.5	1	45	30	31	2.5	2.5	1 0	
43 TS 1 150 2.5 6 C N 2 1 15	27	27	0.0	0.5	1	57	34	34	0.5	0.5	1 0	
43 TS 1 150 2.5 6 C N 2 1 17	35	35	0.0	0.0	1	48	36	36	4.0	0.0	1 0	
43 TS 1 150 2.5 6 C N 2 1 18	26	26	2.0	2.0	1	48	27	27	1.0	1.5	1 0	
43 TS 1 150 2.5 6 C N 2 2 14	23	29	3.5	4.0	1	42	26	26	3.0	3.5	1 0	
43 TS 1 170 5.5 2 C G 2 1 39	67	67	0.0	2.0	1	34	66	66	0.0	4.5	1 0	
43 TS 1 170 5.5 2 C G 2 1 13	57	67	5.5	3.0	1	41	79	79	3.0	6.5	1 0	
43 TS 1 170 5.5 2 C G 2 1 31	31	40	0.0	5.5	1	41	73	73	2.5	5.5	1 0	
43 TS 1 170 5.5 2 C G 2 2 15	77	77	1.0	2.5	1	51	70	70	2.0	4.0	1 0	
43 TS 1 170 5.5 2 C G 2 2 20	68	68	0.0	7.0	1	60	72	72	6.5	7.0	1 0	
43 TS 1 170 5.5 2 C G 2 2 33	95	96	1.0	4.0	1	63	71	71	4.5	5.5	1 0	
43 TS 1 170 5.5 2 C G 2 2 19	76	76	3.5	4.0	1	33	69	69	3.5	7.5	1 0	
43 TS 1 171 5.5 2 C G 2 3 32	111	111	2.0	1.0	1	32	91	91	0.0	2.0	1 0	
43 TS 1 171 5.5 2 C G 2 1 23	48	48	4.5	7.0	1	44	49	49	7.0	7.5	1 0	
43 TS 3 171 2.5 6 C G 2 1 14			2.0	2.5	1	31			0.5	1.5	1 0	

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45 TS	2	185	13.	1	C	G	2	1	12	25	26	6.5	7.	1	20	29	29	4.	5.5	1	0
45 TS	2	185	13.	1	C	G	2	1	14	31	31	4.5	5.	1	26	36	36	6.5	7.5	1	0
45 TS	2	185	13.	1	C	G	2	1	12	24	28	7.	8.	1	22	34	34	7.5	8.	1	0
45 TS	2	185	13.	1	C	G	2	2	8	21	21	5.5	7.	1	21	36	36	6.	7.	1	0
45 TS	2	185	13.	1	C	G	2	2	6	24	24	8.5	9.5	1	26	37	37	10.	10.	1	0
45 TS	2	185	13.	1	C	G	2	2	6	25	25	9.5	11.	1	21	36	36	10.	10.	1	0
45 TS	2	185	13.	1	C	G	2	3	7	24	29	6.5	7.5	1	21	45	45	6.5	8.	1	0
45 TS	2	185	13.	1	C	G	2	3	6	21	22	3.	3.	1	25	58	58	9.	9.	1	0
45 TS	2	185	13.	1	C	G	2	3	12	37	37	5.1	7.5	1	22	55	55	5.5	7.5	1	0
45 TS	1	185	13.	1	C	G	2	1	21	34	34	3.5	5.5	1	42	36	36	3.5	3.5	1	0
45 TS	1	185	13.	1	C	G	2	1	13	24	24	4.	4.	1	45	37	37	5.	5.	1	0
45 TS	1	185	13.	1	C	G	2	1	20	33	33	1.	4.	1	52	33	33	3.5	3.5	1	0
45 TS	1	185	13.	1	C	G	2	2	14	33	33	1.	2.5	1	44	31	31	1.5	2.	1	0
45 TS	1	185	13.	1	C	G	2	1	15	25	25	1.5	1.5	1	26	12	12	0.	1.	1	0
45 TS	3	185	17.	1	C	N	2	1	12	33	33	6.	3.	1	15	50	50	0.	1.5	1	0
45 TS	3	185	13.	1	C	N	2	2	15	34	34	0.	1.5	1	16	57	57	0.	1.5	1	0
45 TS	3	185	13.	1	C	N	2	2	12	32	32	1.	1.	1	21	60	60	1.	1.5	1	0
45 TS	3	185	13.	1	C	N	2	4	34	47	47	1.	2.5	1	25	61	61	1.5	2.5	1	0
45 TS	3	185	13.	1	C	N	2	3	20	34	34	.5	1.	1	23	64	64	.5	1.5	1	0
45 TS	3	185	13.	1	C	N	2	3	24	34	34	.5	2.	1	26	46	46	1.	1.5	1	0
45 TS	3	150	2.5	5	C	N	2	1	13	23	23	7.	9.	1	61	28	28	5.5	6.	2	0
45 TS	3	150	2.5	5	C	N	2	1	20	22	22	4.5	5.5	1	56	21	21	6.	6.5	1	0
45 TS	3	150	2.5	5	C	N	2	1	4	23	23	4.	4.5	1	64	18	18	3.	4.	1	0
45 TS	3	150	2.5	5	C	N	2	2	22	25	25	2.5	4.5	1	49	27	27	8.5	8.5	1	0
45 TS	3	150	2.5	5	C	N	2	2	12	25	25	5.1	7.5	1	50	24	24	7.5	7.5	1	0
45 TS	3	150	2.5	5	C	N	2	2	8	17	17	7.5	7.5	1	55	19	19	6.5	7.5	1	0
45 TS	3	150	2.5	5	C	N	2	3	7	16	16	.5	4.	1	46	14	14	2.	2.	1	0
45 TS	3	150	2.5	5	C	N	2	3	7	14	14	5.	5.5	1	47	15	15	2.5	3.	1	0
45 HT	1	165	25.	3	C	N	3	1	29	39	39	1.5	1.5	1	40	50	50	.5	.5	1	0
45 HT	1	165	25.	3	C	N	3	1	31	41	41	.5	.5	1	39	42	42	1.5	1.5	1	0
45 HT	1	165	25.	3	C	N	3	1	40	43	43	.5	.5	1	24	45	45	1.	1.5	1	0
45 HT	1	165	25.	3	C	N	3	2	17	20	20	1.	2.	1	34	52	52	2.5	2.5	1	0
45 HT	1	165	25.	3	C	N	3	2	25	42	42	1.	1.	1	30	45	45	1.5	1.5	1	0
45 HT	1	165	25.	3	C	N	3	3	14	34	34	1.5	1.5	1	40	51	51	1.5	1.5	1	0
45 HT	1	165	5.	3	C	N	3	1	46	49	49	3.	3.	1	57	32	32	2.	2.	1	0
45 HT	1	165	5.	3	C	N	3	1	31	34	34	3.	3.	1	54	46	46	1.5	1.5	1	0
45 HT	1	165	5.	3	C	N	3	1	15	33	33	5.5	5.5	1	50	35	35	1.5	1.5	1	0
45 HT	1	125	5.	3	C	N	3	2	24	75	75	1.5	1.5	1	45	45	45	3.	3.	1	0
45 HT	1	165	5.	3	C	N	3	2	23	70	70	1.5	1.5	1	38	41	41	1.5	1.5	1	0
45 HT	1	165	5.	3	C	N	3	2	22	60	60	3.	3.	1	26	70	70	1.	1.	2	0
45 HT	1	165	5.	3	C	N	3	3	25	65	65	6.	6.	1	40	75	75	5.5	5.5	1	0
45 HT	1	150	5.	3	C	N	3	3	3.	53	53	3.5	3.5	1	25	47	45	2.5	2.5	2	0
45 HT	1	165	5.	3	C	N	3	3	32	54	54	4.	4.	1	32	56	56	3.	3.	1	0
45 HT	1	150	25.	3	C	N	3	1	22	24	24	3.	3.	1	26	36	36	1.	1.	1	0
45 HT	1	150	25.	3	C	N	3	1	51	24	28	5.	5.5	1	34	26	26	1.5	1.5	1	0
45 HT	1	150	25.	3	C	N	3	1	18	24	24	3.	3.	1	20	29	29	2.	2.	1	0
45 HT	1	170	25.	3	C	N	3	1	20	25	25	1.5	1.5	1	24	28	28	.5	.5	1	0
45 HT	1	170	25.	3	C	N	3	2	33	21	21	2.5	4.	1	25	26	26	0.	3.	1	0
45 HT	1	170	25.	3	C	N	3	2	42	31	31	5.	5.5	1	34	29	29	1.5	3.5	1	0
45 HT	1	150	25.	3	C	N	3	3	16	33	36	1.	1.5	1	22	30	30	1.5	1.5	2	0
45 HT	1	150	25.	3	C	N	3	3	29	30	30	2.	3.	1	20	30	30	1.	1.5	1	0
45 HT	3	190	1.5	4	C	N	3	1	126	45	45	1.5	8.	1	71	38	38	1.	2.5	1	C N
45 HT	3	190	1.5	4	C	N	3	1	121	38	39	1.	2.5	1	80	32	32	1.	1.	1	C N
45 HT	3	190	1.5	4	C	N	3	1	45	51	51	1.	3.	1	61	30	36	1.5	3.5	1	C N
45 HT	3	190	1.5	4	C	N	3	2	34	53	53	.5	2.5	1	81	37	37	4.	4.5	1	C
45 HT	3	190	1.5	4	C	N	3	2	51	53	53	2.	2.5	1	70	30	31	4.	4.5	1	C
45 HT	3	190	1.5	4	C	N	3	2	61	53	53	2.5	3.	1	53	34	34	2.5	3.	1	C
45 HT	3	190	1.5	4	C	N	3	2	3	35	35	.5	1.5	1	13	35	35	2.5	3.	1	C

43	HT	1	190	1.5	4	C	N	3	2	4	25	25	1.	1.	1	28	29	29	.5	2.5	1	C
43	HT	1	190	1.5	4	C	N	3	2	10	19	13	1.5	3.	1	26	29	21	3.	3.	1	C
43	HT	1	190	1.5	4	C	N	3	2	27	28	28	1.5	1.5	1	49	38	38	3.	3.	1	C
43	HT	2	190	1.5	4	C	N	3	2	11	34	36	0.	0.	1	32	34	38	1.5	3.	1	C
43	HT	1	191	1.5	4	C	N	3	3	12	24	24	0.	0.	1	15	34	34	2.	2.	2	C
43	HT	1	192	1.5	4	C	N	3	3	47	41	42	3.	3.	1	27	30	31	1.	1.5	1	C
43	HT	1	193	1.5	4	C	N	3	3	45	34	34	2.	2.	1	60	33	33	1.5	2.	1	C
43	HT	1	193	1.5	4	C	N	3	3	35	32	32	1.	2.	1	49	31	31	1.	1.	2	C
43	HT	1	194	.2	4	C	N	3	1	45	38	38	2.	3.	1	50	41	41	.5	1.5	1	C
43	HT	1	197	.2	4	C	N	3	1	42	34	34	3.	4.	1	52	42	40	3.5	8.1	1	C
43	HT	1	197	.2	4	C	N	3	1	66	49	49	1.	1.	1	57	45	45	.5	3.5	1	C
43	HT	1	195	.2	4	C	N	3	2	35	74	74	0.	0.	1	43	46	48	2.5	5.5	1	C
43	HT	1	195	.2	4	C	N	3	2	49	43	48	4.	5.	1	46	48	48	2.	4.	1	C
43	HT	1	195	.2	4	C	N	3	3	28	21	61	5.	6.	1	24	54	44	2.5	6.	2	C
43	HT	1	195	.2	4	C	N	3	3	76	112	102	3.	0.	1	79	50	50	3.5	5.5	2	C
43	HT	1	199	7.	1	C	N	3	1	72	72	77	0.	0.	1	32	23	23	0.	3.	1	C
43	HT	1	199	7.	1	C	N	3	1	96	71	73	0.	0.	1	44	26	26	0.	0.	1	C
43	HT	1	199	7.	1	C	N	3	1	34	73	75	1.	1.	1	69	37	37	0.	0.	1	C
43	HT	1	199	7.	1	C	N	3	2	60	53	53	0.	0.	1	50	20	20	1.	1.	1	C
43	HT	1	199	7.	1	C	N	3	2	110	91	59	2.	2.	1	48	17	17	.5	1.	1	C N
43	HT	1	199	7.	1	C	N	3	2	95	59	59	1.5	1.5	1	60	14	14	0.	0.	1	C
43	HT	1	199	7.	1	C	N	3	3	34	39	39	0.	0.	1	42	26	26	2.	2.	1	C
43	HT	1	199	7.	1	C	N	3	3	13	62	62	0.	0.	1	44	15	15	1.	1.	1	C
43	HT	1	199	7.	1	C	N	3	3	124	112	102	1.	1.	1	53	28	28	1.	1.	1	C N
43	HT	1	199	6.5	3	C	N	3	1	34	33	23	2.5	2.5	1	49	26	26	1.	4.	1	C
43	HT	1	199	6.5	3	C	N	3	1	47	22	22	1.5	1.5	1	50	24	24	2.	2.	1	C
43	HT	1	199	6.5	3	C	N	3	1	39	26	26	1.	1.	1	68	37	37	.5	2.	1	C
43	HT	1	199	6.5	3	C	N	2	2	43	32	32	2.	2.5	1	47	31	31	2.5	5.	1	C
43	HT	1	199	6.5	3	C	N	3	2	54	23	28	3.5	5.5	1	56	35	35	3.	4.5	1	C
43	HT	1	199	6.5	3	C	N	3	3	51	34	34	.5	1.5	1	47	39	39	0.	1.	1	C
43	HT	1	123	.3	7	C	N	3	1	174	28	24	.5	.5	1	62	28	28	.5	.5	1	C
43	HT	1	123	.3	7	C	N	3	1	93	21	21	0.	0.	1	92	22	22	1.5	1.5	1	C
43	HT	1	123	.3	7	C	N	3	1	64	16	18	0.	0.	1	76	33	33	2.	2.	1	C
43	HT	1	123	.3	7	C	N	3	2	73	23	23	1.	1.	1	67	28	28	0.	0.	1	C
43	HT	1	123	.3	7	C	N	3	2	15	18	18	5.	5.	1	67	25	25	4.	4.	1	C
43	HT	1	123	.3	7	C	N	3	2	102	41	26	1.	1.	1	66	18	18	.5	.5	1	C
43	HT	1	123	.3	7	C	N	3	3	18	29	21	0.	0.	1	68	28	28	1.5	1.5	1	C
43	HT	1	123	.3	7	C	N	3	3	64	23	23	0.	0.	1	46	11	11	2.5	2.5	2	C
43	HT	1	123	.3	7	C	N	3	3	54	24	26	2.	2.	1	51	30	30	2.	2.	1	C
41	PH	1	199	.1	4	C	N	5	2	112	75	75	2.5	1.	2							C
41	PH	1	199	13.	7	C	N	5	1	39	78	78	2.5	3.	1	95	58	58	1.	1.5	1	D
41	PH	1	199	13.	7	C	N	5	1	94	36	26	2.	2.	1	95	55	55	1.5	1.5	1	D
41	PH	2	130	.3	4	C	N	5	3	17	17	17	6.5	6.5	2							0
41	PH	1	130	.3	4	C	N	5	2	35	12	12	5.	5.	1	32	20	21	7.	11.5	1	0
41	PH	1	130	.3	4	C	N	5	2	33	14	14	8.5	8.5	2							0
41	PH	1	130	.3	4	C	N	5	2	54	15	15	7.5	13.5	2							0
41	PH	1	130	.3	4	C	N	5	2	46	34	39	7.5	11.5	2							0
41	PH	1	130	.3	4	C	N	5	2	36	31	31	2.5	4.	2							0
41	PH	1	199	25.	8	C	N	5	1	193	67	65	2.5	4.	1	48	60	60	3.	4.	1	0
41	PH	1	199	25.	8	C	N	5	1	83	52	55	2.5	4.	1	58	60	60	5.	5.5	1	0
41	PH	1	199	25.	8	C	N	5	1	72	70	70	3.	4.	1	52	60	60	2.5	3.5	1	0
41	PH	1	199	25.	8	C	N	5	2	51	59	53	2.	3.	1	52	55	55	5.	5.	1	0
41	PH	1	199	25.	8	C	N	5	2	95	61	60	3.	4.	1	58	50	58	2.5	4.	1	0
41	PH	1	199	13.	7	C	N	5	1	71	43	49	1.	1.5	1	96	50	50	0.	0.	1	0
41	PH	1	199	13.	7	C	N	5	1	70	42	42	0.	2.	1	104	56	56	0.	0.	1	0
41	PH	1	199	13.	7	C	N	5	1	51	23	28	1.	3.5	1	108	55	55	2.5	2.5	1	0
41	PH	1	199	13.	7	C	N	5	1	57	35	35	1.	3.	1	107	50	50	1.	1.	1	0
41	PH	1	199	13.	7	C	N	5	2	39	23	24	1.	2.5	1	99	48	48	0.	1.5	1	0

41	PH	2	160	13.	7	C	N	5	2	42	63	63	J.	2.	1	116	53	53	0.	0.	1	0	
41	PH	2	160	13.	7	C	N	5	3	74	68	68	2.	2.	1	128	48	58	0.	2.	1	0	
41	PH	2	160	13.	7	C	N	5	3	4.	64	64	2.	3.	1	110	59	54	J.	0.	1	0	
41	PH	2	160	13.	7	C	N	5	1	61	23	24	5.	6.	1	74	25	22	5.	5.	2	0	
41	PH	2	160	13.	7	C	N	5	1	103	23	23	1.	4.	1	55	14	14	1.	1.	3.	0	
41	PH	2	170	13.	7	C	N	5	1	44	10	10	5.	4.	1	54	10	10	2.	5.	1	0	
41	PH	2	130	13.	7	C	N	5	2	51	19	19	3.	5.	1	46	13	13	2.	3.	1	0	
41	PH	2	130	13.	7	C	N	5	2	33	11	11	13.	13.	2							0	
41	PH	2	130	13.	7	C	N	5	2	58	12	12	2.	5.	2							0	
41	PH	2	130	13.	7	C	N	5	3	45	25	25	3.	3.	2							0	
41	PH	2	130	13.	7	C	N	5	3	35	14	14	4.	4.	2							0	
41	PH	2	130	13.	7	C	N	5	3	52	23	24	8.	8.	2							0	
41	PH	2	140	7.	5	7	C	G	3	1	75	53	53	1.	7.	1	73	63	63	1.	3.	1	C
41	PH	2	170	4.	3	C	G	8	1	45	42	42	5.	1.	1	101	58	58	0.	1.	1	C	
41	PH	3	175	4.	3	C	G	8	1	75	32	42	1.	2.	1	63	66	63	0.	3.	1	C	
41	PH	3	175	4.	3	C	G	8	1	133	116	116	1.	3.	1	109	42	42	4.	4.	1	C	
41	PH	3	175	4.	3	C	G	8	2	72	33	33	3.	3.	1	112	42	42	2.	2.	1	C	
41	PH	3	175	4.	3	C	G	8	2	113	113	113	0.	4.	1	72	52	32	1.	2.	1	C	
41	PH	3	175	4.	3	C	G	8	2	104	83	88	5.	2.	1	108	61	61	0.	3.	1	C	
41	PH	3	175	4.	3	C	G	8	3	14	42	42	2.	3.	1	82	56	56	2.	2.	1	C	
41	PH	3	175	4.	3	C	G	8	3	74	78	78	2.	2.	1	91	51	51	0.	0.	1	C	
41	PH	3	175	4.	3	C	G	8	3	20	58	58	1.	2.	1	73	55	55	0.	1.	1	C	
41	PH	3	145	7.	5	7	C	G	4	2	98	57	62	7.	7.	2						C	
41	PH	3	145	7.	5	7	C	G	4	1	127	34	34	2.	4.	2						C	
41	PH	3	145	7.	5	7	C	G	4	1	123	74	74	3.	4.	2						C	
41	PH	3	145	7.	5	7	C	G	4	1	107	87	87	0.	5.	1	49	43	43	1.	5.	1	C
41	PH	3	145	7.	5	7	C	G	4	2	125	62	62	2.	7.	1	44	52	52	1.	8.	1	C
41	PH	3	145	7.	5	7	C	G	4	2	133	67	67	2.	4.	1	48	52	52	0.	14.	1	C
41	PH	3	145	7.	5	7	C	G	4	2	113	53	53	4.	6.	2						C	
41	PH	3	145	7.	5	7	C	G	4	3	83	52	52	0.	8.	1	31	29	29	4.	4.	1	C
41	PH	3	145	7.	5	7	C	G	4	3	73	53	53	2.	10.	1	41	28	28	3.	3.	1	C
41	PH	3	145	7.	5	7	C	G	4	3	122	35	35	2.	3.	1	61	42	42	2.	2.	1	C
41	PH	3	145	8.	3	C	N	7	1	15	76	78	2.	2.	1	22	93	93	1.	1.	1	0	
41	PH	3	195	8.	3	C	N	7	1	17	38	88	2.	2.	1	18	93	93	0.	0.	1	0	
41	PH	2	195	8.	3	C	N	7	2	14	73	70	0.	0.	1	37	73	73	0.	0.	1	0	
41	PH	2	195	8.	3	C	N	7	2	4	53	52	2.	2.	1	16	89	89	0.	0.	1	0	
41	PH	2	195	8.	3	C	N	7	3	17	74	74	1.	1.	1	20	84	84	0.	0.	1	0	
41	PH	2	195	8.	3	C	N	7	3	11	49	49	1.	1.	1	28	80	80	0.	0.	1	0	
41	PH	3	145	7.	5	7	C	G	3	1	78	53	53	0.	0.	1	47	39	39	2.	3.	2	C
41	PH	3	145	7.	5	7	C	G	3	1	92	43	43	5.	5.	1	67	30	30	3.	4.	1	C
41	PH	3	145	7.	5	7	C	G	3	1	85	49	49	4.	4.	2						C	
41	PH	3	145	7.	5	7	C	G	3	2	61	45	45	4.	4.	2						C	
41	PH	3	173	11.	1	C	N	1	1	31	90	90	2.	2.	1	28	52	52	3.	3.	1	I	
41	PH	2	145	8.	3	C	F	7	1	20	15	15	1.	1.	1	15	65	65	0.	0.	1	0	
41	PH	2	195	8.	3	C	F	7	2	32	55	55	1.	1.	1	23	80	80	0.	0.	1	0	
41	PH	2	195	8.	3	C	F	7	2	23	80	80	0.	0.	1	35	78	78	0.	0.	1	0	
41	PH	2	195	8.	3	C	F	7	3	17	32	52	2.	2.	1	23	69	69	2.	2.	1	0	
41	PH	2	195	8.	3	C	N	7	2	39	57	57	0.	0.	1	25	70	70	0.	0.	1	0	
41	PH	2	19	8.	3	C	N	7	3	36	72	72	J.	1.	1	38	70	70	1.	1.	1	0	
41	PH	2	195	8.	3	C	N	7	3	23	60	60	0.	0.	1	38	70	70	0.	0.	1	0	
41	PH	2	195	8.	3	C	N	7	3	30	55	54	0.	0.	1	32	80	80	0.	0.	1	0	
41	PH	2	195	8.	3	C	N	7	1	12	32	85	0.	0.	1	16	90	80	2.	2.	1	0	
41	PH	3	173	11.	1	C	N	1	2	29	70	70	1.	1.	1	18	50	50	2.	2.	1	I	
41	PH	3	173	11.	1	C	N	1	2	44	32	42	3.	3.	1	38	60	60	7.	7.	1	I	
41	PH	3	170	11.	1	C	N	1	3	61	89	85	3.	3.	1	30	62	62	6.	6.	1	I	
41	PH	3	170	11.	1	C	N	1	3	41	78	78	3.	3.	1	32	91	91	6.	6.	1	I	
41	PH	3	170	11.	1	C	N	1	1	45	73	73	2.	2.	1	22	65	65	5.	5.	1	I	
41	PH	3	170	11.	1	C	N	1	1	35	77	77	0.	0.	1	19	38	38	7.	7.	1	I	

4T PH 3 170 11. 1 C N 1 2 3. 45 83 1. 1. 1 22 50 50 2.5 2.5 1 I
4T PH 3 170 11. 1 C N 1 2 31 30 90 4. 5. 1 25 50 50 5. 5. 1 I
4T PH 3 171 11. 1 C N 1 2 26 99 99 4. 5. 1 25 60 60 4.5 4.5 1 I
4T PH 3 172 11. 1 C N 1 2 21 47 47 1.5 1.5 1 25 54 54 4.5 4.5 1 I
4T PH 3 150 .2 2 C N 1 1 2' 31 31 4.5 4.5 1 31 22 22 1.5 1.5 1 I
4T PH 3 155 16. 1 C N 1 1 71 71 75 1. 1. 1 45 50 50 3. 3. 1 I
4T PH 3 155 16. 2 C N 1 1 81 75 72 2. 2. 1 40 55 55 5. 5. 1 I
4T PH 3 155 16. 2 C N 1 1 71 75 75 2. 2. 1 41 60 60 1.5 4. 1 I
4T PH 3 155 16. 2 C N 1 1 75 40 60 4.5 6. 1 40 60 60 2.5 2.5 1 I
4T PH 3 155 16. 2 C N 1 1 32 61 69 4.5 5. 1 50 60 60 5. 5. 1 I
4T PH 3 155 16. 2 C N 1 2 10 41 40 2. 2. 1 64 70 70 3. 3. 1 I
4T PH 3 155 16. 2 C N 1 1 90 71 70 2. 2.5 1 45 75 7. 1.5 1.5 1 I
4T PH 3 170 11. 1 C N 1 2 40 60 60 2. 2. 1 20 40 40 4. 4. 1 I
4T PH 3 170 11. 1 C N 1 2 35 71 71 3.5 3.5 1 15 50 5. 9.5 9.5 1 I
4T PH 3 150 .2 2 C N 1 2 23 35 36 4. 4. 1 20 38 38 1.5 1.5 1 I
4T PH 3 150 .2 2 C N 1 2 14 23 23 2. 2. 1 30 34 34 3.5 3.5 1 I
4T PH 3 150 .2 2 C N 1 2 34 30 30 2.5 2.5 1 20 30 30 0. 0. 1 I
4T PH 3 150 .2 2 C N 1 2 11 41 41 6. 6.5 1 28 35 35 4. 4. 1 I
4T PH 3 150 .2 2 C N 1 2 20 40 40 6.5 6.5 1 20 28 28 1. 1. 1 I
4T PH 3 150 .2 2 C N 1 1 19 30 32 1.5 1.5 1 25 28 28 1. 1. 1 I
4T PH 3 150 .2 2 C N 1 1 21 28 28 4. 4. 1 28 32 32 5. 5. 1 I
4T PH 3 150 .2 2 C N 1 2 22 31 31 4. 4. 1 35 25 25 5. 5. 1 I
4T PH 3 150 .2 2 C N 1 2 20 31 30 1. 1. 1 31 28 28 .5 1.5 1 I
4T PH 3 150 .2 2 C N 1 1 32 35 35 4. 4. 1 27 30 30 5. 5. 1 I
4T PH 3 155 16. 2 C N 1 1 111 61 60 0. 1.5 1 80 50 50 5. 5. 1 I
4T PH 3 180 .1 4 C G 2 1 32 42 42 1. 2.5 1 53 31 31 1. 1. C
4T PH 3 180 .1 4 C G 3 1 53 37 57 2.5 2.5 1 53 35 35 0. 0. C
4T PH 3 180 .1 4 C G 2 1 53 42 42 3. 3. 1 57 36 36 2. 2.5 C
4T PH 3 180 .1 4 C G 2 2 90 35 55 5.5 6.5 1 55 30 30 2. 2. C
4T PH 3 180 .1 4 C G 3 2 34 33 33 2. 3. 1 58 26 26 4. 4. C
4T PH 3 180 .1 4 C G 2 2 33 40 40 4. 4.5 1 61 31 31 2.5 2.5 C
4T PH 3 180 .1 4 C G 3 3 52 48 48 1. 2.5 1 60 52 52 6. 7.5 C
4T PH 3 180 .1 4 C G 3 3 114 32 52 3. 7.5 2 C
4T PH 2 150 2. 4 C N 5 3 34 52 52 1. 1.5 2
4T PH 2 150 2. 4 C N 5 3 52 41 81 1.5 2. 2
4T PH 2 150 2. 4 C N 5 3 21 71 71 1.5 6.5 2
4T PH 3 145 7.5 7 C G 2 101 36 56 8. 8. 2 C
4T PH 3 145 7.5 7 C G 3 2 47 47 1. 5. 2 C
4T PH 3 145 7.5 7 C G 2 52 50 4. 5.5 2 C
4T PH 3 145 7.5 7 C G 3 2 74 44 44 2.5 4. 1 45 37 37 3.0 4.5 1 C
4T PH 3 145 7.5 7 C G 8 3 77 41 41 2.5 3.5 1 24 31 31 4.0 4.0 1 C
4T PH 3 145 7.5 7 C G 3 3 53 33 56 3.5 6. 1 52 31 31 5. 5.5 1 C
4T PH 3 145 7.5 7 C G 3 104 45 45 1.5 4.5 1 52 38 38 1.5 4. 1 C
4T PH 1 150 2. 4 C N 5 1 46 58 58 .5 1.5 1 41 54 54 4. 5.5 2 0
4T PH 1 151 2. 4 C N 5 1 55 50 50 .5 .5 1 66 69 69 0. 1.5 1 0
4T PH 1 150 2. 4 C N 5 1 82 30 91 2.5 7. 1 71 71 71 1.5 5.5 1 0
4T PH 1 150 2. 4 C N 5 2 53 52 52 1. 7. 1 65 68 68 1. 1. 1 0
4T PH 1 150 2. 4 C N 5 2 75 42 42 4. 4. 1 64 72 72 .5 5.5 1 0
4T PH 1 150 2. 4 C N 5 2 51 63 68 1.5 7. 1 62 50 50 2.5 3.5 1 0
4T PH 1 150 2. 4 C N 5 3 45 48 49 2.5 6.5 1 50 51 51 1.5 4.5 1 0
4T PH 1 150 2. 4 C N 5 3 38 74 74 1.5 4.5 2
4T TS 2 145 1. 3 C N 6 2 22 12 12 2. 2. 1 33 26 26 2. 2.5 1 0
4T TS 2 145 1. 3 C N 6 2 26 28 28 .5 1. 1 40 27 27 2. 2.5 1 0
4T TS 2 145 1. 3 C N 6 1 12 14 14 2.5 2.5 1 40 32 32 2.5 3. 1 0
4T TS 2 145 1. 3 C N 6 1 22 18 18 3. 3. 1 42 22 22 2.5 2.5 1 0
4T TS 2 145 1. 3 C N 6 1 23 14 14 1.5 2.5 1 40 30 30 1.5 2.5 1 0
4T TS 2 145 1. 3 C N 6 2 32 12 12 2. 3. 1 20 28 28 2. 2. 1 0
4T TS 3 145 1. 3 C N 6 1 43 20 22 5. 5. 1 41 32 32 5. 5. 1 0

41 TS 3 145	1.	3	C	N	6	1	32	15	15	3.	3.5	1	40	23	23	3.	3.	1 0
41 TS 3 145	2.	3	C	N	6	1	31	27	27	3.5	4.5	1	40	20	20	6.	6.	1 0
41 TS 3 145	3.	3	C	N	6	1	30	31	30	1.5	1.5	1	30	20	20	2.	2.	1 0
41 TS 3 145	4.	3	C	N	6	1	28	24	24	1.	1.	1	30	25	25	0.	1.	1 0
41 TS 3 145	5.	3	C	N	6	3	61	25	27	3.	3.	1	60	22	22	0.5	1.	1 0
41 TS 3 145	6.	3	C	N	6	1	27	25	25	1.5	2.2	1	22	20	20	4.5	4.5	1 0
41 TS 3 145	7.	5	C	N	6	1	35	33	30	4.	4.	1	60	35	35	2.5	2.5	1 0
41 TS 3 145	8.	5	C	N	6	1	41	33	32	1.5	1.5	1	60	35	32	1.5	1.5	1 0
41 TS 3 145	9.	5	C	N	6	2	45	35	35	3.5	3.5	1	41	35	35	2.5	3.	1 0
41 TS 3 145	10.	5	C	N	6	2	41	22	22	2.5	2.2	1	41	40	40	2.5	4.	1 0
41 TS 3 145	11.	5	C	N	6	2	42	35	35	3.	3.	1	72	40	40	5.5	5.5	1 0
41 TS 3 170	25.	3	C	N	6	1	32	32	32	3.	3.	1	35	25	25	4.	4.	1 0
41 TS 3 170	26.	3	C	N	6	1	42	30	30	3.5	3.5	1	55	23	23	3.5	3.5	1 0
41 TS 3 170	27.	3	C	N	6	1	41	21	21	2.	2.2	1	73	25	25	2.	2.	1 0
41 TS 3 170	28.	3	C	N	6	1	31	33	33	4.	4.	1	50	20	20	4.	4.	1 0
41 TS 3 170	29.	3	C	N	6	2	24	32	32	5.	5.	1	45	20	20	3.	3.	1 0
41 TS 3 170	30.	3	C	N	6	2	31	18	19	2.5	2.5	1	60	12	12	2.5	2.5	1 0
41 TS 3 170	31.	3	C	N	6	3	23	31	32	1.5	1.5	1	62	18	18	1.5	1.5	1 0
41 TS 3 170	32.	3	C	N	6	1	75	25	25	5.	5.	1	75	20	20	0.5	0.5	1 0
41 TS 3 170	33.	3	C	N	6	1	77	15	15	4.5	4.5	1	55	20	20	1.	1.	1 0
41 TS 3 170	34.	3	C	N	6	1	45	22	22	2.	2.	1	55	20	20	1.	1.	1 0
41 TS 3 170	35.	3	C	N	6	2	72	21	21	1.5	2.	1	68	17	17	3.	3.	1 0
41 TS 3 145	1.	3	C	N	6	2	55	28	28	2.	2.	1	48	32	32	3.	3.	1 0
41 TS 3 145	1.	3	C	N	6	1	64	18	18	2.5	2.5	1	55	37	35	3.	3.	1 0
41 TS 3 145	1.	3	C	N	6	2	53	21	21	1.5	1.5	1	45	30	30	3.5	4.	1 0
41 TS 3 145	1.	3	C	N	6	2	51	19	19	3.5	3.5	1	55	28	28	4.	4.	1 0
41 TS 3 145	1.	3	C	N	6	3	37	23	23	2.5	3.	1	45	20	20	3.5	3.5	1 0
41 TS 3 145	1.	3	C	N	6	3	25	23	20	3.5	4.5	1	43	32	32	2.	2.5	1 0
41 TS 3 170	25.	3	C	F	6	1	57	21	21	4.5	4.5	1	61	22	22	4.5	4.5	1 0
41 TS 3 170	25.	3	C	F	6	1	105	22	22	4.	4.	1	70	18	18	3.	3.	1 0
41 TS 3 170	25.	3	C	F	6	1	50	18	18	3.5	3.5	1	91	22	22	3.	3.	1 0
41 TS 3 170	25.	3	C	F	6	1	42	13	19	4.5	4.5	1	104	15	15	3.5	3.5	1 0
41 TS 3 145	1.	5	C	N	6	3	38	45	42	5.	5.5	1	62	35	35	4.5	4.5	1 0
41 TS 3 145	1.	5	C	N	6	3	35	25	25	2.5	4.	1	49	30	30	2.	2.5	1 0
41 TS 3 145	1.	5	C	N	6	3	42	33	30	3.5	3.5	1	42	20	20	2.5	2.5	1 0
41 TS 3 145	1.	3	C	N	6	2	31	38	38	0.	0.5	1	30	41	40	0.5	0.5	1 0
41 HY 3 170	5.5	3	C	N	2	1	22	31	31	4.0	4.0	1	59	21	21	1.0	5.0	1 0
41 HY 3 170	5.5	3	C	N	2	1	16	13	19	2.5	2.1	1	36	16	16	0.0	3.0	1 0
41 HY 3 170	5.5	3	C	N	2	1	21	21	21	2.0	4.0	1	41	20	20	1.0	1.5	1 0
41 HY 3 170	5.5	3	C	N	2	1	21	21	21	3.0	4.5	1	42	12	12	1.5	2.5	1 0
41 HY 3 170	5.5	3	C	N	2	1	31	19	13	3.5	3.0	1	41	12	12	0.5	1.5	1 0
41 HY 3 170	5.5	3	C	N	2	1	23	13	13	2.0	3.0	1	51	12	12	0.5	4.5	1 0
41 HY 3 170	5.5	3	C	N	2	1	24	11	11	4.0	7.5	1	45	20	20	6.0	7.5	1 0
41 HY 3 170	5.5	3	C	N	2	1	20	13	13	0.5	3.5	1	35	11	11	3.5	4.5	1 0
41 HY 3 170	3.	5	C	G	2	2	67	24	24	1.5	2.5	1	48	26	26	1.5	2.5	1 0
41 HY 3 170	3.	5	C	G	2	2	61	31	33	1.5	2.5	1	47	36	36	3.	3.5	1 0
41 HY 3 170	3.	5	C	G	2	2	61	41	40	3.	1.5	1	38	34	34	1.	1.	1 0
41 HY 3 170	3.	5	C	G	2	2	59	42	42	3.	3.	1	48	46	46	3.	3.	1 0
41 HY 3 170	3.	5	C	G	2	2	55	27	27	2.	2.	1	52	30	30	3.	3.	1 0
41 HY 3 170	3.	5	C	G	2	2	71	33	33	3.	2.5	1	56	34	34	3.	3.	1 0
41 HY 3 150	2.5	5	C	G	2	2	71	29	25	0.	1.	1	64	15	15	0.	0.5	1 0
41 HY 3 150	2.5	5	C	G	2	2	70	28	28	1.5	2.	1	91	21	21	1.5	1.	1 0
41 HY 3 150	2.5	5	C	G	2	2	83	13	13	1.5	4.	1	107	28	28	4.5	4.5	1 0
41 HY 3 150	2.5	5	C	G	2	2	54	17	17	1.	4.	1	76	28	28	5.5	6.	1 0
41 HY 3 150	2.5	5	C	G	2	2	71	24	24	5.	4.	1	80	30	30	5.	9.5	1 0
41 HY 3 170	5.5	5	C	G	2	2	69	24	24	3.	3.2	1	33	30	34	3.	5.	1 0
41 HY 3 170	5.5	5	C	N	2	1	61	22	22	2.1	4.1	1	7	14	14	5.1	5.5	2 0
41 HY 3 170	5.5	5	C	N	2	1	54	24	24	4.5	5.	1	41	27	27	4.1	7.5	1 0

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63	HX	2	170	5.5	2	C	N	2	1	35	13	18	1.0	4.1	1	67	26	26	2.5	3.6	1	0
64	HX	2	170	5.5	2	C	N	2	1	55	22	22	9.1	10.5	1	50	34	34	10.5	10.5	1	0
65	HX	2	170	5.5	2	C	N	2	1	45	23	23	8.0	4.5	1	67	30	30	2.5	5.5	1	0

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APPENDIX C

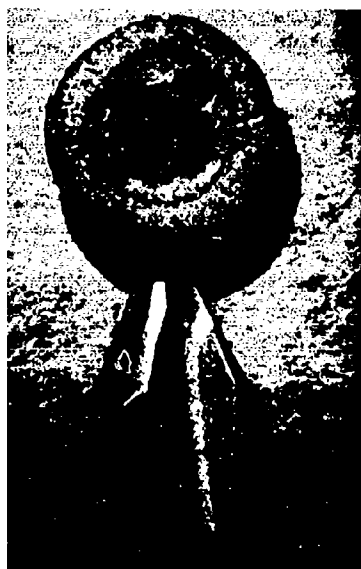
TYPICAL FAILURE PHOTOGRAPHS



High Torque Condition 01



Tri-Wing Condition 01



Phillips Condition 01



Torx Condition 01

Figure C-1. Typical Failures, 20 Pound End Load



Ribbed Torq-Set Condition 01



Ribbed Phillips Condition 01



High Torque Condition 17



Torx Condition 17



Tri-Wing Condition 17



Phillips Condition 17



High Torque Condition 01



Torque Set Condition 17

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