

August 1990

Field Note N°: General-15  
Previous Reference Sheet N°: None

## JONSERED 2051CW "TURBO" CHAIN SAW

### GENERAL

Since their introduction to the forest industry some 50 years ago, the development of gasoline chain saws has been spurred by a series of technological advances. Early innovations included the multi-position carburetor, direct drive from the crankshaft, the rewind starter, and cutting chain redesign. More recent changes include a steady improvement in power-to-weight ratios, reductions in both noise and vibration levels, and the universal implementation of chain brakes on professional model saws. It has however, been many years since the forest industry has been presented with conceptually-new chain saw components. The manufacturer of the Jonsered 2051CW "Turbo" chain saw makes that claim based on a number of new, innovative features. To evaluate these claims, the 2051CW was field tested by FERIC's Woodlot Technology group in February 1990, at Larose Forest near Bourget, Ont.

### THE JONSERED 2051CW TURBO

In early 1990, Jonsered Motor A.B. of Sweden introduced the 2051CW "Turbo" to the North-American market through its Canadian distributor, JOSA Corp. of Lachute, Quebec. This followed the introduction of the non-computerized version, the 2051 Turbo, one year earlier. The CW version is similar in appearance to its predecessor and both are 51 cc in size. Inside the 2051CW Turbo's engine cowl and starter casing are several technological innovations for the chain saw industry. These features include: a microprocessor-governed spark advance (this differentiates the 2051 from the 2051CW), a flywheel-produced turbo charger effect, and a dust and chip pre-air filter system. Other notable state-of-the-art features are: an effective anti-vibration damping system, a noise level of only 100 dbA, an inertia chain brake, inboard clutch mounting, and a power output rating of 2.7 kW.

### FEATURES

**Microprocessor - governed spark advance:** The computer chip adjusts the spark advance in the 2000 to 4000 and in the 11000 + RPM ranges. This results in:

- Smooth acceleration as the high-speed carburetor jet opens, eliminating mid-range loss of power.

- Improved combustion efficiency and hence lower fuel consumption. (NOTE: Claimed by manufacturer, but not evaluated during FERIC field trial).
- Decreased tendency to lose RPM during cross cutting.
- Serves as an onboard tachometer, thereby assisting in carburetor adjustment.

In addition to providing smoother engine performance, the microprocessor serves in a safety capacity as well. During a full-throttle start in cold weather with the choke, or when using a one-handed "yo-yo" start (not a recommended starting procedure), the computer chip limits engine idle speed to 2700 RPM. Since clutch engagement does not occur until 3400 RPM, the operator is not faced with the potentially dangerous situation of operating the saw one-handed with the saw chain rotating. Control over engine speed is returned to the operator once the throttle trigger has been released and depressed a second time.

**Dust control system and turbo charger effect:** Most chain saws on the market today allow for combustion air to reach the air filter via passive means. This requires that the engine create a negative pressure zone (as a result of the compression stroke) in the area surrounding the carburetor's intake orifice. Moreover, as chain saws have evolved over the years, much emphasis has been placed on decreasing the physical size and weight of the chain saw, and in increasing its power output and engine RPM. This reduction in size has also resulted in smaller air filters. Because of the small air filters on most chain saws, keeping the air filter clean is critical for proper engine performance.

The Jonsered 2051CW Turbo eliminates both the passive delivery of combustion air and the need for frequent cleaning of the air filter by utilizing the air flow and centrifugal force created by the flywheel. Air enters the flywheel area by means of over-sized grating on the starter casing. As the air is rotated by the flywheel, any impurities, such as wood chips and dust, are thrown by centrifugal force to the outside of the flywheel casing and expelled via a chip port. The clean air on the inside of the flywheel casing is drawn off by means of a collector chute (see Figure 1) and is delivered to the air filter in pressurized form. According to the manufacturer, the air delivered to the air box

(the area enclosing the carburetor and air filter) is virtually free of particulate matter as a result of using this system.

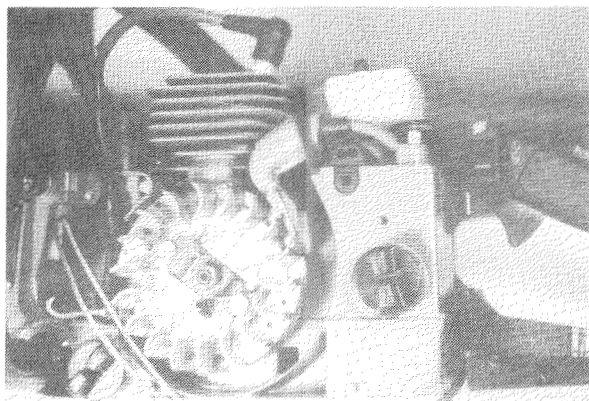


Figure 1. The Jonsered 2051CW uses centrifugal force of the flywheel to expel wood chips and dust and to provide clean air to the carburetor.

FERIC's field evaluations confirmed the manufacturer's claims. Air filter cleaning for the 2051CW was not required during the 10-day test period; all other saws used during this period required cleaning of the air filter at least once a day. NOTE: FERIC's test was in a red pine stand in winter conditions. Other conditions (e.g. dry, dead wood cut during summer conditions) might provide less favourable results.

**Thermostatically-controlled pre-heater:** Pre-heating of the "cleaned" combustion air is conducted by rerouting the air flow from the flywheel via tubing to the muffler. There it travels through a series of cores, is heated and is then transported to the carburetor. Pre-heated air enhances cold weather operation of the chain saw, minimizes engine wear, and eliminates the need for other winterizing accessories that are sometimes installed on chain saws (e.g. shrouds & shields). The pre-heater is controlled by a mechanical thermostat that opens at temperatures below 20° C and closes at 25° C, thus ensuring pre-heating only when necessary and eliminating the potential for vapor lock or noticeable power loss associated with high-temperature combustion air.

**Vibration:** The manufacturer-reported vibration levels for the 2051CW are 2.5 m/s<sup>2</sup> and 4.2 m/s<sup>2</sup> front and rear handle respectively under cutting load conditions. Tests at full throttle, no load, yielded 2.3 m/s<sup>2</sup> and 2.8 m/s<sup>2</sup>, front and rear handles respectively. They are claimed to be some of the lowest ever recorded by European test facilities for this size of chain saw. While little comparative information is available, it is interesting to note that Jonsered is one of the few manufac-

turers that publishes vibration levels for their chain saws in their brochures. FERIC staff noted that the low vibration level made the 2051CW a very comfortable saw to operate.

#### **Inboard mounting of the clutch drum and brake band:**

The design of the 2051CW brake band minimizes the possibility of it becoming clogged with wood chips and/or chain oil. NOTE: On chain saws equipped with outboard clutch mounting, chain brake failure is commonly attributed to inadequate cleaning of the brake band/casing assembly. This problem should be much reduced on the 2051CW.

**On the negative side:** The retail price of \$629 is about \$100 higher than similar size 50-55cc competitor models. Also, the off/on button did not shut off the saw on a couple of occasions during the FERIC tests; the reason for this was not clear but could be moisture related.

#### **SUMMARY**

Field trails of the Jonsered 2051CW conducted by FERIC staff in February 1990 indicate that this 51-cc chain saw is well suited for its intended market, the part-time or full-time producer of pulpwood or small sawlogs. The 2051CW delivers an excellent balance and an impressive power-to-weight ratio. Smooth, positive acceleration and the ability to retain RPM throughout the entire cross-cutting sequence permit efficient limbing and bucking. Also, the minimal maintenance of the air filter and the reduced noise and vibration levels were considered important advantages as compared to other chain saws. Although FERIC's test was not of a sufficient duration to comment on the long-term durability of the unit, the distributor has indicated that the rated engine life is the same as for all Jonsered professional saws. Not all professional users will opt for the computerized (CW) version of the 2051 Turbo. This is, however, a recommended feature for part-time users (e.g. farm woodlot owners, hydro-line maintenance, construction crews, etc.) where the operator may not be as cognizant of safe starting procedures. Jonsered plans to introduce the features from the 2051CW to its larger chain saws in the future.

#### **DISCLAIMER**

This report is based on limited field observation and is published solely to disseminate information to FERIC's members. It is not intended as an endorsement or approval by FERIC of any product or service to the exclusion of others that may be suitable.

Peter S. Hamilton, R.P.F., Researcher  
Woodlot Technology, Eastern Division