Toxics Reduction Plan

Manganese

Prepared by:

Aisin Canada Inc.
130 Wright Blvd,
Stratford ON N4Z 1H3

December 2012

Contents

1.0 Statement of Intent

Aisin Canada Inc. is committed to reducing the environmental impact of its manufacturing operations. Management will continue to explore options to reduce the usage of toxic substances while providing innovative solutions to our customers.

Existing programs to investigate rejected or substandard parts will continue with the objective of eliminating waste due to quality defects.

2.0 Facility Information

Toxic Substance	Manganese
CAS#	7439-96-5
Number of full-time equivalent employees	276
NAICS	336390 Other Motor Vehicle Parts Manufacturing
NPRI ID	11735
UTM NAD83 coordinates (entrance)	449132, 4800355

Canadian Parent Company

Legal name	n/a
Street address	n/a
% owned by parent	n/a
CCRA business number	n/a

Contact info

Owner and operator of facility	Aisin Canada Inc. 130 Wright Blvd, Stratford ON N4Z 1H3
Highest ranking employee	Wayne Robert Manufacturing Manager Aisin Canada Inc. 130 Wright Blvd, Stratford ON N4Z 1H3 519 271 1575 wrobert@aisincanada.com
Person who coordinated preparation of plan	Alice Hodgson Aisin Canada Inc. 130 Wright Blvd, Stratford ON N4Z 1H3 519 271 1575 ahodgson@aisincanada.com
Person who prepared plan	Wendy Nadan Nadan Consulting Ltd 151 Montgomery Blvd Orangeville ON L9W 5C1 519 940 4724 wendy@nadanconsulting.com
Public contact	Bill Boon Aisin Canada Inc. 130 Wright Blvd, Stratford ON N4Z 1H3

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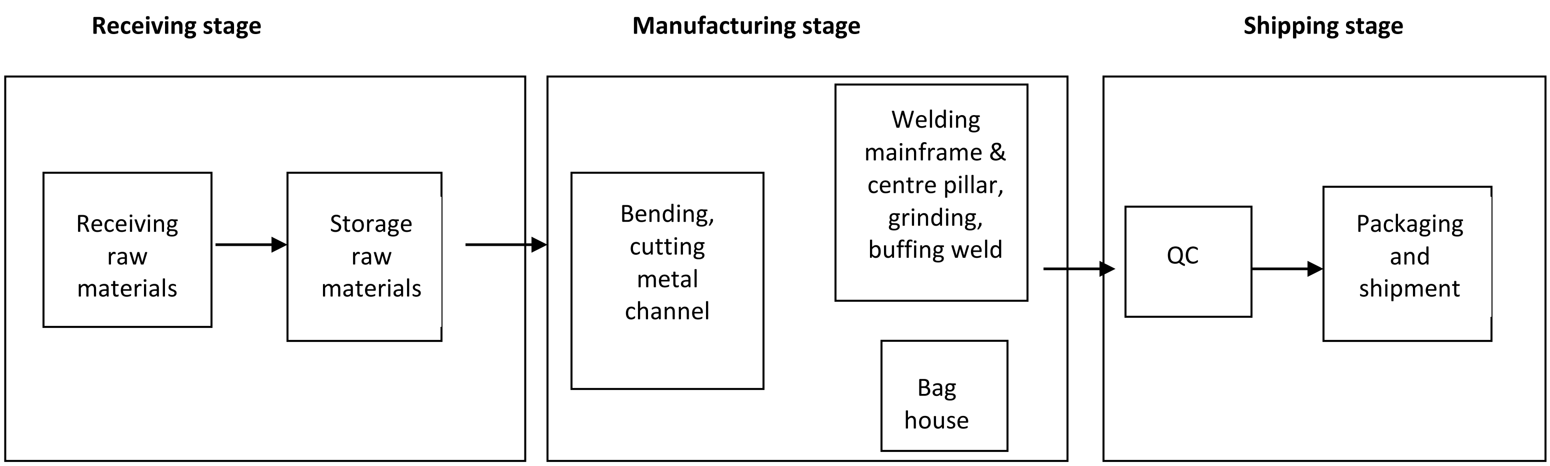
Technical contact	Wendy Nadan Nadan Consulting Ltd 151 Montgomery Blvd Orangeville ON L9W 5C1 519 940 4724 wendy@nadanconsulting.com
Planner License number of planner	Wendy Nadan Nadan Consulting Ltd 151 Montgomery Blvd Orangeville ON L9W 5C1 519 940 4724 TRSP 0092

3.0 Identification of Stages and processes



Manufacturing processes
AISIN manufactures components for the automotive industry, specifically, door frames, sun roofs and seat components. Metal is received in prefabricated shapes, ready to be bent and welded into the final part.

Carbon is a chemical element that is the primary hardening constituent in steel. Manganese is a chemical element that is present in all commercial steels, and contributes substantially to steel's strength and hardness, but to a lesser extent than does carbon.

The effectiveness of manganese in increasing mechanical properties depends on, and is proportional to, the carbon content of the steel. Manganese also plays an important role in decreasing the critical cooling rate during hardening. This means that manganese helps to increase the steel's hardenability. Its effect on hardenability is greater than that of any of the other commonly used alloying elements. Manganese is also an active deoxidizer**,** and is less likely to segregate than other elements.

Manganese improves machinability**,** by combining with sulfur to form a soft inclusion in the steel that promotes a steady built up edge and a place for the chip to break. Manganese also improves yield at the steel mill by combining with the sulfur in the steel, minimizing the formation of iron pyrite (iron sulfide) which can cause the steel to crack and tear during high temperature rolling.

The first stage of manufacturing is to bend the mainframe and centre pillar. The ends are then cut off before the mainframe and pillar are welded together. The weld is then ground down and buffed to remove any rough surface.

End cuts are collected and sent off site for recycling. Welding fumes and grinding particulate are captured and pass through a Torrit dust collector which vents inside the building.

Once all manufacturing steps have been completed on the part, it is packaged and shipped to the customer.

Process Description
Door frames: Raw material is received in the form of a metal (steel) channel at a specified length. The doorframe consists of two separate pieces, the mainframe and center pillar. These components are formed from the metal channel to the appropriate shape in a hydraulic bending machine. Additionally, trim saws are used to cut miters, notches and the final length. These trims saws are not a source of air emissions as cutting occurs at a very low RPM (approx 200 rpm), which produces large metal chips and shavings as opposed to a dust.

Next, the center pillar and mainframe are clamped in a welding jig, which are then welded together with robotic welders, utilizing Gas Metal Arc Welding (GMAW) and Gas Tungsten Arc Welding (GTAW) technology. Welding operations have the potential to release fumes, which are considered to be particulate matter. Exhaust from all arc welding operations is controlled by fume collectors that exhaust inside the building. Additionally, two of the lines have a subassembly for a mirror bracket, which uses resistance welding in the process and is controlled by a fume collector. Further, one line uses a resistance welder for welding a support bracket across the door frame.

Finally, the weld is ground flat with an abrasive disc, and buffed smooth with a fine grit-buffing pad. All buffing and grinding is done manually with handheld equipment. Additionally, both the grinding and buffing operations are controlled by dust collectors, which exhaust inside the building.

In total, AISIN has 5 door frame lines that have 13 robotic welders (includes both GMAW and GTAW), and 5 grinding and buffing operations, which are all controlled by fume collectors that exhaust inside the building.

Seat components: Raw material is received in the form of metal (steel) parts by AISIN. The manufacturing process involves manual assembly operations and welding, which include gas metal arc welding GMAW and resistance welding processes. AISIN uses a total of 5 robotic GMAW welding stations and 15 resistance welding stations in the process. The exhaust from all welding operations is controlled by fume collectors, which exhaust inside the building.

Miscellaneous Activities – In addition to the door frame and seat component processes, AISIN has the following processes: PVC heat welder, walk-lock assembly, door belt line and nylon part coating process.

Material Accounting Calculations

The materials that contain manganese were identified by examination of the MSDS for chemicals and product certifications for metals. See the 2011 NPRI report for detailed calculations of quantities of toxic substances used and their disposition.

The total quantity of manganese used in 2011 was calculated based on the certificate provided by the supplier for each type of metal and the quantity of the metal purchased.

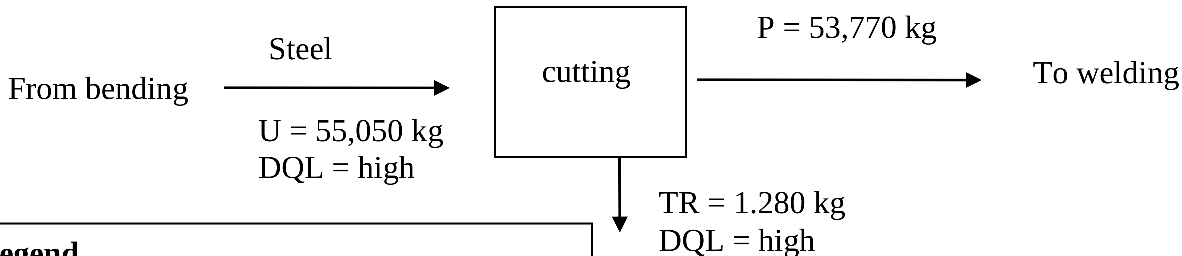
This mass balance gives the input quantity for the facility. The data quality is considered high as it is based on a mass balance calculation with information provided by the supplier.

Mass balance was used as the method of quantification as the data is readily available and quantities are based on measured weights.

All the metal used exits the process either as a finished good, as waste that is shipped off-site for recycling, or as an air emission from welding. It is assumed that the quantity lost in the grinding process is insignificant. The weight shipped off-site is measured and recorded on shipping manifests. The amount emitted to air is based on published emission factors. The balance of the material used is assumed to be contained in finished goods.

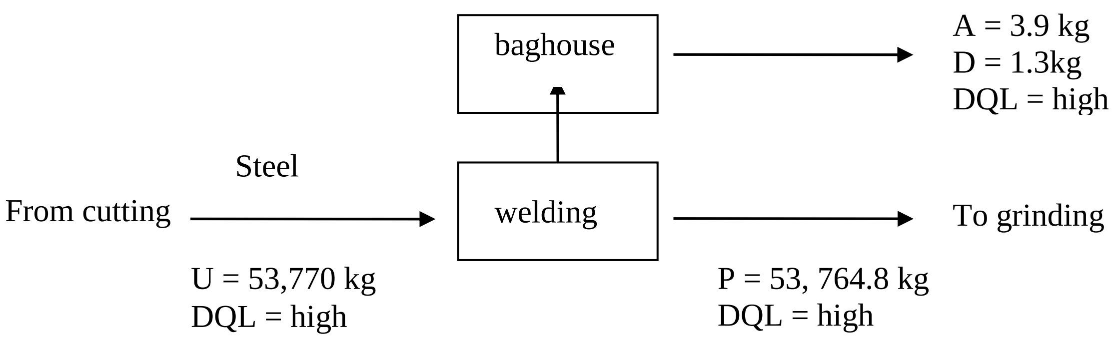
It is considered that the inputs and outputs are approximately equal.

Cutting process



Legend
U Use of toxic substance
P Toxic substance contained in product
TR Transferred off-site for recycling
DQL data quality level
→ Presence of toxic substance

Welding process



Legend
U Use of toxic substance
P Toxic substance contained in product
A Emissions to air
D Disposed offsite
DQL data quality level
→ Presence of toxic substance

4.0 Estimated Direct and Indirect Costs

Costs are estimated for the handling of manganese in 2011. As there are no technically feasible options to reduce the usage of manganese to compare the existing cost to, only the major contributors to the cost have been included. If technically feasible options are identified in the future, the cost will be refined.

Raw materials	$41,394,000
Utilities	$373,000
Labour	$11,709,000
Scrap metal	$283,000
Total	**$53,193,000**

5.0 Identification of Options for Reduction in Usage of Manganese

The following options were identified to reduce the usage of manganese.

Category	Description
Material substitution/Process modification	Option 1: Use metal alloys that are manganese-free. This will result in a reduction in use of 55.05 tonnes of manganese or 100%. Option 2: Use metal alloys that have lower manganese content. Reduction in usage will vary depending on the actual manganese content.
Product Design	Door frames manufactured in the facility are made of steel as one part of a fully assembled vehicle. The finished parts are assembled with multiple other parts manufactured in different facilities. The product specifications are provided by the customer. Aisin has no control of the product design and hence there is no option available in this category.
Spill and leak prevention	The toxic substance is a solid contained in a metal alloy and hence there is no potential for a spill or leak.
Reuse or recycling	All metal waste is currently collected and recycled and hence there is no option available in this category.
Inventory management/Training	Option 3: Purchase just-in-time for orders as they are received. Option 4: Train employees to order minimum quantities for each job order. Option 5: Communicate results of investigations of rejected/substandard parts to employees in order to improve quality and reduce scrap from rejected parts. These options ensure that exact quantities are purchased and there is minimum waste as scrap. There was no scrap generated due to excess inventory in2011 and hence this option is not expected to result in any reduction in usage of manganese. As Aisin is part of a long supply chain for vehicle manufacture and assembly, quantities and scheduling of door frames manufactured are dictated by the supply chain and Aisin staff has no control over inventory.

	There is already a process to investigate rejected/substandard parts and to implement preventive actions so that the waste does not reoccur. This process will continue in place with the goal of eliminating all rejects however it is not expected to result in any direct reduction in the use of manganese.

6.0 Analysis of Technical Feasibility

Each of the options identified above were screened for technical feasibility using the following criteria:

- Availability and reliability of technology
- Impacts on quality, reliability, functionality
- Impact on production rate
- Compatibility with customer requirements
- Availability of employee training
- Compatibility with existing processes
- Space within facility
- Time required for change

The results are recorded in the following table:

Option	Technical Feasibility	Feasible
Option 1: Use metal alloys that are manganese-free. Option 2: Use metal alloys that have lower manganese content.	Pre-fabricated metal steel channels to manufacture door frames are received into the facility in specific lengths. Aisin does not specify the type of steel used in the steel channel. The customer provides the specifications and the auto parts manufacturers in the supply chain receive the steel at various stages of fabrication and deliver the steel part to the next manufacturer along the chain. As Aisin has no control over the steel specifications, it is not technically feasible to eliminate or reduce the manganese in the steel, or to substitute a different material such as aluminum.	No

7.0 Analysis of Economic Feasibility

There are no technically feasible options and therefore no economic feasibility analysis has been completed.

8.0 Implementation of Options

There are no technically or economically feasible options due to customer specifications of the raw materials and hence no options will be implemented.

9.0 Planner Recommendations

The planner has worked with the facility throughout the development of the plan and suggestions have been addressed as they have arisen. Therefore there are no further recommendations to this plan.

10.0 Certification

As of December 3, 2012, I, Wayne Robert, certify that I have read the toxic substance reduction plan for manganese and am familiar with its contents, and to my knowledge the plan is factually accurate and complies with the Toxics Reduction Act, 2009 and Ontario Regulation 455/09 (General) made under that Act.

Wayne Robert, Manufacturing Manager

Date

As of December 3, 2012, I, Wendy Nadan certify that I am familiar with the processes at Aisin Canada that use manganese, that I agree with the estimates referred to in subparagraphs 7 iii, iv and v of subsection 4 (1) of the Toxics Reduction Act, 2009 that are set out in the plan dated November 30, 2012 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Wendy Nadan, Toxic Substance Reduction Planner

Date