San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

2007 Area Source Emissions Inventory Methodology
430 – MINERAL PROCESSES – SURFACE BLASTING

I. Purpose

This document describes the Area Source Methodology used to estimate emissions of fine particulate matter less then 10 microns (PM_{10}) generated from surface (abrasive) blasting for processes in the San Joaquin Valley Air Basin. An area source category is a collection of similar emission units within a geographic area (i.e., a County). An area source category collectively represent individual sources that are small and numerous, and that may not have been inventoried as specific point, mobile, or biogenic sources. The California Air Resources Board (CARB) has grouped these individual sources with other like sources into area source categories. These source categories are grouped in such a way that they can be estimated collectively using one methodology.

II. Applicability

The emission calculations from this Area Source Methodology apply to facilities that are identified by the following Category of Emission Source (CES) code and Reconciliation Emission Inventory Code (REIC):

Table 1. Emission inventory codes.

CES	REIC	Description
47027	430-428-7000-0000	Surface Blasting

III. Point Source Reconciliation

Emissions from the area source inventory and point source inventory are reconciled against each other to prevent double counting. This is done using relationships created by the California Air Resources Board (ARB) between the area source REIC and the point sources' Standard Industry Classification (SIC) code and the emissions process' Source Category Code (SCC) combinations. The area sources in this methodology reconcile against processes in our point source inventory with the SIC/SCC combinations listed in Appendix A.

IV. Methodology Description

Surface blasting is the cleaning or preparing of a surface by propelling a stream of abrasive material against it. Surface blasting is primarily used to remove rust, scale, old paint; or burrs from surfaces prior to painting, bonding or coating. Surface blasting can be done in an enclosure (confined) or in an open area (unconfined). Particulate matter emissions are much lower in confined operations, but enclosures are often not feasible when surface blasting large objects.

Surface blasting systems include four basic components: an abrasive blasting pot, a propelling device (centrifugal wheel, air pressure or water pressure), an abrasive blasting nozzle, and abrasive material. Abrasive materials can be classified as follows:

- Sand. Sand is the least expensive abrasive, but one that creates the most dust. Sand is usually used in unconfined operations where the abrasive cannot be recycled.

- Grit. Grit is generally made from crushed cast iron waste.

- Metallic shot. Metallic shot is cast iron or steel beads that are commonly used in enclosures since they are more expensive than other abrasives

- Other. Other abrasives include glass beads, crushed glass, plastics, silicon carbide, aluminum oxide, boiler slag and nutshell.

Industries that employ surface blasting include the aeronautic, automotive, container, non-ferrous metals, oil and gas, railway, ship building and repair, and steel.

This methodology is based on one developed by Sonoma Technology Inc. (STI, 2002) for the Central California Ozone Study. Domestic abrasive material consumption in 2007 was obtained from the United States Geological Survey or industry groups. National abrasive consumption was then disaggregated to the counties in the District using sector specific industrial employment data from the United States Census Bureau as a surrogate. County level abrasive material consumption rates were then multiplied by emission factors to calculate emissions.

V. Activity Data

National abrasive material consumption. The United States Geological Survey (USGS, 2010) makes annual estimates of mineral production, exports, imports and stocks. From this data, they calculate an apparent consumption. Following is a summary of the derivation of the apparent consumption of abrasive blasting materials in the United States:

- Sand. Industrial sand consumption for 2007 was obtained from the United States Geological Survey (USGS, 2010). It was estimated that 6.68% of industrial sand was used as an abrasive. This value was derived from USGS industrial sand and gravel end use statistics data from 1975-2003 (average value).

- Grit/steel shot. Grit/steel shot consumption for 2007 was obtained from the USGS (2010). It was assumed that 100% of the grit/steel shot was used for abrasive blasting.

- Natural stone abrasives, aluminum oxide, and silicon carbide. Natural stone abrasives include corundum, emery and Tripoli. Consumption of these materials, as well as aluminum oxide and silicon carbide, in 2007 was obtained from the USGS (2010). It was assumed that 100% of these materials were used for abrasive blasting.

- Garnet. Garnet consumption for 2007 was obtained from the USGS (2010). It was estimated that 40.14% of the garnet was used as an abrasive. This value was derived from USGS garnet end use statistics data from 1975-2003 (average value).

- Boiler slag. Boiler slag production data is no longer available from the USGS. The amount of boiler slag produced in 2007 for use as an abrasive was obtained from the American Coal Ash Association (2008).

Apparent consumption of abrasive materials in the United States in 2007 is summarized in the following table:

Table 2. Apparent consumption of abrasive materials in the United States in 2007.

Material	Abrasive production		Surface blasting consumption	
	(metric tons)	(short tons)	(%)	(short tons)
Sand	27,700,000	30,533,710	6.68%	2,039,652
Grit/steel shot	215,600	237,656	100.00%	237,656
Other				
Natural stone abrasives[1]	96,600	106,482	100.00%	106,482
Aluminum oxide	228,800	252,206	100.00%	252,206
Silicon carbide	180,000	198,414	100.00%	198,414
Garnet	77,600	85,538	40.14%	34,335
Boiler slag	1,377,658	1,518,592	100.00%	1,518,592
Other total	1,960,658	2,161,233	--	2,110,030

[1]Corundum, emery, Tripoli, etc

County level consumption. STI (2002) determined that abrasive blasting was primarily performed by the following industry groups:

- Ship building and repair (NAICS 3366XX)
- Aircraft manufacturing (NAICS 33641X)
- Metal manufacturing
  - Steel product manufacturing from purchased steel (NAICS 3312XX)
  - Alumina and aluminum production and processing (NAICS 3313XX)
  - Nonferrous metal (except aluminum) production and processing (NAICS 3314XX)
  - Fabricated metal product manufacturing (NAICS 332XXX)
- Oil and gas extraction (NAICS 211XXX)

County and United States employment for these industries in 2007 was obtained from the United States Census Bureau (2010), and is presented in the following table:

Table 3. Employment by sectors likely to use abrasive blasting materials. Source: U.S. Census Bureau, County Business Patterns (2007).

County	Employment by Sector (no. of employees)					Percent of U.S.
	Ship Bldg & Repair[1]	Aircraft Mfg[2]	Metal Mfg.[3]	Oil & Gas Extraction[4]	Total	
Fresno	60	10	2,400	10	2,480	0.10%
Kern	0	175	1,099	1,451	2,725	0.11%
Kings	0	0	96	0	96	0.00%
Madera	10	0	279	0	289	0.01%
Merced	375	0	325	0	700	0.03%
San Joaquin	10	10	2,818	10	2,848	0.12%
Stanislaus	0	0	2,525	0	2,525	0.10%
Tulare	0	60	1,177	10	1,247	0.05%
United States	148,864	408,139	1,734,812	141,809	2,433,624	100.00%

[1]Ship Building and Repair industry represented by NAICS 3366XX.
[2]Aircraft Manufacturing industry represented by NAICS 33641X.
[3]Metal Manufacturing industry represented by NAICS 3312XX, 3313XX, 3314XX, and 332XXX.
[4]Oil & Gas Extraction industry represented by NAICS 211XXX.

County level abrasive material consumption was then estimated by multiplying the national consumption data by the county level employment statistics as shown in the following table:

Table 4. Total consumption of abrasive blasting materials in the District (2007).

County	Percent of U.S.	Abrasive Material Consumption (tons)		
		Sand	Grit/Steel shot	Other
Fresno	0.10%	2,040	238	2,110
Kern	0.11%	2,244	261	2,321
Kings	0.00%	0	0	0
Madera	0.01%	204	24	211
Merced	0.03%	612	71	633
San Joaquin	0.12%	2,448	285	2,532
Stanislaus	0.10%	2,040	238	2,110
Tulare	0.05%	1,020	119	1,055
United States	100.00%	2,039,652	237,656	2,110,030

To estimate the District's area source consumption of abrasive blasting material, the, the amount of material reported through the District's point source inventory was subtracted from the total county level consumption as shown in the following table:

Table 5. Point source and area source consumption of abrasive blasting materials in the District (2007).

County	Point Source Abrasive Material Consumption (tons)			Area Source Abrasive Material Consumption (tons)		
	Sand	Grit/Steel shot	Other	Sand	Grit/Steel shot	Other
Fresno	260	46	44	1,780	191	2,066
Kern	983	13	245	1,260	248	2,076
Kings	0	0	6	0	0	0
Madera	201	42	36	3	0	175
Merced	3	0	0	609	71	633
San Joaquin	691	115	214	1,757	170	2,318
Stanislaus	250	72	63	1,790	165	2,047
Tulare	25	1	0	994	118	1,055
TOTAL	2,413	289	608	8,193	963	10,370

VI. Emission Factors

PM_{10} emission factors for abrasive blasting were obtained from the STAPPA/ALAPCO (1991). The PM_{10} emissions are assumed to be uncontrolled.

Table 6. Emission factors for uncontrolled and unconfined abrasive blasting.

Abrasive	Emission factors			
	lb PM/lb-abrasive	lb PM_{10}/lb PM	lb PM_{10}/lb-abrasive	lb PM_{10}/ton abrasive
Sand	0.041	0.70	0.029	58
Grit	0.010	0.70	0.007	14
Steel shot	0.004	0.86	0.003	6
Other	0.010	1.00	0.010	20

VII. Emissions Calculations

A. Assumptions

1. Area source abrasive blasting operations are assumed to be unconfined, uncontrolled, and the abrasive propelled by air.

2. Since the USGS does not specify the percentage of metallic abrasive that is grit or steel shot, all metallic abrasives are conservatively assumed to be grit.

B. Sample Calculations

PM_{10} emissions are calculated for each type of abrasive material using the following equation:

$$\left(\frac{tons\ PM_{10}\ emitted}{year}\right)=\left(\frac{tons\ abrasive\ consumed}{year}\right)x\left(\frac{lbs\ PM_{10}\ emitted}{ton\ abrasive\ consumed}\right)x\left(\frac{1\ ton}{2{,}000\ lbs}\right)$$

To calculate PM_{10} area source emissions from abrasive surface blasting in Fresno Emission in 2007:

Given:

1. 1,780 tons of sand, 191 tons of steel grit/shot and 2,066 tons of other abrasive materials were consumed by non-permitted sources in Fresno County in 2007

Calculate emissions:

$$Sandblasting\ emissions=\left(\frac{1{,}780\ tons\ consumed}{year}\right)x\left(\frac{58\ lbs\ PM_{10}\ emitted}{ton\ consumed}\right)x\left(\frac{1\ ton}{2{,}000\ lbs}\right)=51.62\ tons\ PM_{10}$$

$$Grit\ \&\ shot\ emissions = \left(\frac{191\ tons\ consumed}{year}\right) x \left(\frac{14\ lbs\ PM_{10}\ emitted}{ton\ consumed}\right) x \left(\frac{1\ ton}{2{,}000\ lbs}\right) = 1.34\ tons\ PM_{10}$$

$$Other\ abrasives\ emissions = \left(\frac{2{,}066\ tons\ consumed}{year}\right) x \left(\frac{20\ lbs\ PM_{10}\ emitted}{ton\ consumed}\right) x \left(\frac{1\ ton}{2{,}000\ lbs}\right) = 20.66\ tons\ PM_{10}$$

Total area source PM_{10} emissions = 51.62 tons + 1.34 tons + 20.66 tons
= 73.62 tons

VIII. Temporal Variation

A. Daily

CARB Code 12. 12 hours per day - uniform activity during the day.

B. Weekly

CARB Code 5. 5 days per week - uniform activity on week days; none on Saturday or Sunday

C. Monthly

Uniform monthly activity: 8.33% per month

IX. Spatial Variation

Emissions from surface blasting can be distributed with each county using industrial employment as a surrogate (COG industrial employment numbers in a grid cell / total industrial employment numbers in a county.)

X. Growth Factor

Growth factors are developed by either the District's Strategies and Incentives Department or CARB for each EIC. These factors are used to estimate emissions in future years. The growth factors associated with this emissions category may be obtained from the District's Strategies and Incentives Department.

XI. Control Level

Surface blasting operations are subject to State regulation (California Code of Regulations, Title 17, Subchapter 6: Abrasive Blasting). Control levels associated with this emissions category may be obtained from the District's Strategies and Incentives Department.

XII. CARB Chemical Speciation

CARB has developed particulate matter speciation profiles in order to calculate particulate matter (PM), particulate matter with a diameter less than or equal to 10 microns (PM_{10}) or particulate matter with a diameter less than or equal to 2.5 microns ($PM_{2.5}$) given any one of the three values. For each speciation profile, the fraction of PM that is PM_{10} and $PM_{2.5}$ is given. The particulate matter profile codes can also be used to lookup associated toxics. CARB's speciation profile for surface blasting is presented below.

Table 7. CARB particulate matter speciation profiles for 430-428-7000-0000

Profile Description	CARB PM Profile#	Fractions	
		PM_{10}	$PM_{2.5}$
Mineral Process Loss	371	0.5	0.146

XIII. Assessment of Methodology

This methodology relies on the accuracy of the apparent consumption of abrasive materials estimated by the USGS. In addition, it assumes that industrial employment in the ship building and repair, aircraft manufacturing, metal manufacturing and oil & gas extraction industries can be used to accurately disaggregate the national consumption of these abrasive materials to the county level. Other conservative assumptions were made that may cause an overestimation of this inventory including:

- All abrasive materials consumed are used for surface blasting. This assumption is made since the amount used to produce sand paper or for other purposes is unknown.
- All non-permitted (area source) surface blasting operations are unconfined and uncontrolled.
- The USGS does not distinguish between metallic shot and grit, so all metallic abrasives were considered grit since it had the larger emission factor.

Consumption of non-mineral abrasives such as walnut hulls could not be determined. This will result in an underestimation of emissions to some degree.

XIV. Emissions

Following is the 2007 area source emissions inventory for REIC 430-428-7000-0000 estimated by this methodology. Emissions are reported for each county in the District.

Table 8. Area source emissions for REIC 430-428-7000-0000 (2007)

County	Emissions (tons/year)					
	NOx	CO	SOx	VOC	PM_{10}	$PM_{2.5}$[(1)]
Fresno	0.00	0.00	0.00	0.00	73.62	N/A
Kern	0.00	0.00	0.00	0.00	59.05	N/A
Kings	0.00	0.00	0.00	0.00	0.00	N/A
Madera	0.00	0.00	0.00	0.00	1.82	N/A
Merced	0.00	0.00	0.00	0.00	24.50	N/A
San Joaquin	0.00	0.00	0.00	0.00	75.31	N/A
Stanislaus	0.00	0.00	0.00	0.00	73.52	N/A
Tulare	0.00	0.00	0.00	0.00	40.21	N/A
TOTAL	0.00	0.00	0.00	0.00	348.03	N/A

(1) At this time, the District does not calculate PM2.5 emissions. PM2.5 emissions can be estimated using the speciation profiles found in Section XII.

Following is the 2007 point source emissions inventory for REIC 430-428-7000-0000 as reported to the District by our permit holders. Emissions are reported for each county in the District.

Table 9. Point source emissions for REIC 430-428-7000-0000 (2007)

County	Emissions (tons/year)					
	NOx	CO	SOx	VOC	PM_{10}	$PM_{2.5}$[(1)]
Fresno	0.00	0.00	0.00	0.00	4.82	N/A
Kern	0.00	0.00	0.00	0.00	12.21	N/A
Kings	0.00	0.00	0.00	0.00	0.08	N/A
Madera	0.00	0.00	0.00	0.00	3.53	N/A
Merced	0.00	0.00	0.00	0.00	0.00	N/A
San Joaquin	0.00	0.00	0.00	0.00	9.96	N/A
Stanislaus	0.00	0.00	0.00	0.00	8.28	N/A
Tulare	0.00	0.00	0.00	0.00	0.33	N/A
TOTAL	0.00	0.00	0.00	0.00	39.21	N/A

(1) At this time, the District does not calculate PM2.5 emissions. PM2.5 emissions can be estimated using the speciation profiles found in Section XII.

Following is the 2007 total unreconciled (point source plus area source) emissions inventory for REIC 430-428-7000-0000. Emissions are reported for each county in the District.

Table 10. Total emissions for REIC 430-428-7000-0000 (2007)

County	Emissions (tons/year)					
	NOx	CO	SOx	VOC	PM_{10}	$PM_{2.5}$ (1)
Fresno	0	0	0	0	78.44	N/A
Kern	0	0	0	0	71.25	N/A
Kings	0	0	0	0	0.08	N/A
Madera	0	0	0	0	5.35	N/A
Merced	0	0	0	0	24.50	N/A
San Joaquin	0	0	0	0	85.27	N/A
Stanislaus	0	0	0	0	81.80	N/A
Tulare	0	0	0	0	40.53	N/A
TOTAL	0	0	0	0	387.22	N/A

(1) At this time, the District does not calculate PM2.5 emissions. PM2.5 emissions can be estimated using the speciation profiles found in Section XII.

Following is the net change in total unreconciled emissions between this update (2007 inventory year) and the previous inventory year (2006) for REIC 430-428-7000-0000. The change in emissions is reported for each county in the District.

Table 11. Net emissions change for REIC 430-428-7000-0000 (2007-2006).

County	Emissions (tons/year)					
	NOx	CO	SOx	VOC	PM_{10}	$PM_{2.5}$ (1)
Fresno	0.00	0.00	0.00	0.00	73.58	N/A
Kern	0.00	0.00	0.00	0.00	59.72	N/A
Kings	0.00	0.00	0.00	0.00	0.00	N/A
Madera	0.00	0.00	0.00	0.00	1.29	N/A
Merced	0.00	0.00	0.00	0.00	24.50	N/A
San Joaquin	0.00	0.00	0.00	0.00	71.60	N/A
Stanislaus	0.00	0.00	0.00	0.00	73.45	N/A
Tulare	0.00	0.00	0.00	0.00	40.20	N/A
TOTAL	0.00	0.00	0.00	0.00	344.34	N/A

(1) At this time, the District does not calculate PM2.5 emissions. PM2.5 emissions can be estimated using the speciation profiles found in Section XII.

XV. Revision History

2007 This is a new District methodology.

XVI. Update Schedule

In an effort to provide inventory information to CARB and other District programs and maximize limited resources, the District has developed an update cycle based on emissions within the source category as shown in the following table:

Table 12. Area source update frequency criteria.

Total Emissions (tons/day)	Update Cycle (years)
<=1	4
>1 and <= 2.5	3
>2.5 and <=5	2
>5	1

Since PM_{10} emissions are less than one ton per day, this area source estimate will be updated every four years.

Table 13. Abrasive Blasting methodology update frequency.

EIC	Frequency (years)	Source of Emissions (Point Source Inventory / Data Gathering)
430-428-7000-0000	4	Point Source Inventory / Data Gathering

XVII. References

1. American Coal Ash Association. 2008. 2007 coal combustion product (CCP) production & use survey results. One page.

2. Kura, B. 2005. Residual risk from abrasive blasting emissions: Particle size and metal speciation. Report prepared for the Advanced Technology Institute. 34 pages.

3. Serageldin, M. 2009. Emission factors for abrasive materials. Paper presented at the 18th Annual International Emission Inventory Conference for Comprehensive Inventories -Leveraging Technology and Resources. Baltimore, MD, April 14 - 17, 2009. 14 pages

4. Sonoma Technology, Inc. 2002. Central California ozone study. Attachment E: Mineral processes. <http://www.arb.ca.gov/ei/areasrc/ccosmethods.html>

5. STAPPA/ALAPCO. 1991. Air quality permits. A handbook for regulators and industry. Section 2: Unconfined abrasive blasting. 16 pages.

6. United States Census Bureau. 2007. Censtats databases – county business patterns. Accessed online at: http://censtats.census.gov/ on December 27, 2010.

7. United States Environmental Protection Agency. 1997. AP 42, Fifth Edition, Volume I, Chapter 13: Miscellaneous fugitive sources, Section 2.6: Introduction to fugitive dust sources: Abrasive Blasting. 4 pages.

8. United States Geological Survey. 2010. Data Series 140: Historical statistics for mineral and material commodities in the United States. Version 2010 available online only at http://minerals.usgs.gov/ds/2005/140/index.html#ref

XVIII. Appendix

Appendix A. Inventory Reconciliation Codes

Appendix A. Inventory Reconciliation Codes

Table 14. EIC, SCC and SIC codes in the District's 2007 point source inventory that reconciled to REIC 430-428-7000-0000

EIC	SCC	Point Source Type	SIC
430-428-7000-0000	30900201	FABRICATED METAL – ABRASIVE BLASTING OF METAL PARTS/GENERAL	1311, 1389, 1442, 1446, 1522, 1541, 1542, 1622,1721, 1742, 1771, 1794, 1799, 2032, 2051, 2064,2259, 2281, 2399, 2431, 2499, 2511, 2514, 2519, 2521, 2591, 2631, 2813, 2834, 2841, 2851, 2869, 2879, 2891, 2899, 2911, 2951, 3069, 3087, 3221, 3251, 3255, 3269, 3273, 3275, 3281, 3291, 3295, 3312, 3316, 3321, 3324, 3325, 3341, 3351, 3357, 3365, 3366, 3369, 3398, 3411, 3412, 3429, 3432, 3433, 3441, 3443, 3444, 3446, 3449, 3451, 3452, 3462, 3463, 3471, 3479, 3494, 3498, 3499, 3511, 3531, 3533, 3535, 3542, 3556, 3563, 3572, 3599, 3621, 3646, 3663, 3669, 3672, 3674, 3676, 3679, 3699, 3711, 3714, 3721, 3724, 3728, 3731, 3732, 3743, 3761, 3795, 3799, 3826, 3827, 3829, 3949, 3991, 3993, 4111, 4172, 4231, 4449, 4494, 4581, 4712, 4911, 4922, 4931, 4941, 4952, 4953, 4971, 5039, 5063, 5082, 5084, 5085, 5088, 5093, 5172, 5199, 5211, 5311, 5511, 5541, 5551, 6512, 6732, 7216, 7353, 7359, 7384, 7389, 7513, 7514, 7532, 7534, 7538, 7539, 7629, 7694, 7699, 7996, 7999, 8011, 8062, 8069, 8211, 8221, 8249, 8741, 8999, 9199, 9223, 9511, 9621, 9661, 9711
	30900299	FABRICATED METAL – ABRASIVE BLASTING OF METAL PARTS/GENERAL	1721, 1799, 3053, 3471, 3511, 3551, 3565, 3728, 3731, 3732, 4011, 3931, 5084, 9711
430-428-7078-0000	30900202	FABRICATED METAL – ABRASIVE BLASTING OF METAL PARTS SAND ABRASIVE	1389, 1429, 1442, 1446, 1522, 1541, 1542, 1611, 1629, 1721, 1771, 1791, 1799, 2063, 2091, 2514, 2631, 2656, 2813, 2819, 2851, 2879, 2899, 2911, 2951, 3081, 3089, 3264, 3273, 3274, 3281, 3291, 3312, 3316, 3317, 3321, 3322, 3325, 3357, 3665, 3366, 3369, 3398, 3412, 3441, 3443, 3444, 3446, 3449, 3469, 3471, 3479, 3494, 3497, 3498, 3499, 3511, 3519, 3539, 3549, 3553, 3572, 3585, 3599, 3674, 3711, 3711, 3715, .3721, 3724, 3728, 3731, 3732, 3761, 3764, 3993, 4493, 4581, 4785, 4789, 4911, 5931, 5941, 4952, 5082, 5088, 5093, 5171, 5541, 7353, 7359, 7532, 7641, 7694, 7699, 8221, 8711, 8733, 9111, 9223, 9511, 9621, 9711, ,
430-428-7084-0000	30900203	FABRICATED METAL – ABRASIVE BLASTING OF METAL PARTS SLAG ABRASIVE	1629, 1721, 1799, 3471, 3511, 3533, 3731, 3732, 4911, 4931, 5171, 9199, 9621, 9711,

EIC	SCC	Point Source Type	SIC
430-428-7036-0000	30900204	FABRICATED METAL – ABRASIVE BLASTING OF METAL PARTS GARNET ABRASIVE	1629, 1721, 1799, 3444, 3462, 3471, 3479, 3511, 3559, 3721, 3724, 3728, 3731, 3949, 4911, 4931, 4941, 9711
430-428-7088-0000	30900205	FABRICATED METAL – ABRASIVE BLASTING OF METAL PARTS STEEL GRIT ABRASIVE	1799, 2514, 2911, 3061, 3084, 3272, 3324, 3412, 3429, 3443, 3444, 3462, 3471, 3479, 3511, 3533, 3549, 3714, 3724, 3731, 3732, 3999, 4581, 7532, 7534, 7694, 9711
430-428-6084-0000	30900206	FABRICATED METAL – ABRASIVE BLASTING OF METAL PARTS WALNUT SHELL ABRASIVE	3731, 9711
430-428-7090-0000	30900207	FABRICATED METAL – ABRASIVE BLASTING OF METAL PARTS SHOTBLAST W/AIR ABRASIVE	1474, 1721, 1799, 2514, 3272, 3312, 3321, 3366, 3463, 3471, 3495, 3531, 3714, 3731, 3799, 4011, 4911, 4931, 7389, 9711
	30900208	FABRICATED METAL – ABRASIVE BLASTING OF METAL PARTS SHOTBLAST AIR;ESS ABRASIVE	3444, 3483, 3714, 9711